THE ABLE MARINE ENERGY PARK DEVELOPMENT CONSENT ORDER 2014

APPLICATION FOR A NON-MATERIAL CHANGE

APPLICATION STATEMENT INCORPORATING ENVIRONMENTAL INFORMATION

JULY 2018

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C	Final	03/09/18

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1 INTRODUCTION

1.1 GENERAL

1.1.1 This statement is made in support of the application by Able Humber Ports Limited (the Applicant) for a non-material change to The Able Marine Energy Park Development Consent Order 2014 (Statutory Instrument 2014 No. 2935), ('the DCO'). The application is made pursuant to Schedule 6 of the Planning Act 2008 and Part 1 of the Infrastructure Planning (Changes to, Revocation of, Development Consent Orders) Regulations 2011.

1.2 PLANNING BACKGROUND

1.2.1 On 29 October 2014, the Applicant was granted the DCO for development of a new quay and associated development at Killingholme in North Lincolnshire on the south bank of the Humber estuary.

1.2.2 The DCO included approval of the siting of two ecological mitigation areas. These were identified in the application documents as Mitigation Areas A and B, refer to Figure 1.1 below. In addition, when granting the DCO, the Secretary of State (SoS) required the Applicant to provide grassland at Halton Marshes as part of a package of compensation measures for Black-Tailed Godwits. This is referred to as the 'Over Compensation'.

1.2.3 Mitigation Area A comprises a 16.7 ha core (undisturbed) area of wet grassland habitat surrounded by a 150m wide buffer strip (offering protection from disturbance for the core area). Area A is needed to provide wet grassland habitat for the use of feeding and roosting waders, and also breeding birds. Mitigation Area B comprises a plot of 0.7 ha, adjacent to the Chase Hill Wood local wildlife site, identified as mitigation to complement the local wildlife site for the use of Great Crested Newts, including the provision of new ponds. Both areas were provided for within the Order Limits of the DCO.

1.2.4 In the DCO Decision letter dated 18 December 2013, the SoS (at paragraph 37) left the details of the exact proposals for the Over Compensation to be agreed by Natural England through their approval of a Compensation Environmental Management and Monitoring Plan. Following approval by Natural England, the Over Compensation is to be provided at Halton Marshes (see Figure 1.2). This site lies outside of the Order limits but the land is owned by the Applicant.

1.2.5 Mitigation Area B is not affected by this application and has now been built.

1.2.6 In addition to obtaining permission to construct the Able Marine Energy Park under the DCO, the Applicant has separately secured planning permission from North Lincolnshire Council to construct Able Logistics Park (ALP), planning reference PA/2015/1264. In accordance with the conditions accompanying the decision (in particular condition 49) a core area comprising 32ha of wetland mitigation (suitably buffered) was to be created to mitigate the impact of the ALP development. Some of the wetland mitigation may be provided off site, however at least 12ha of core area, must be provided on Halton Marshes.

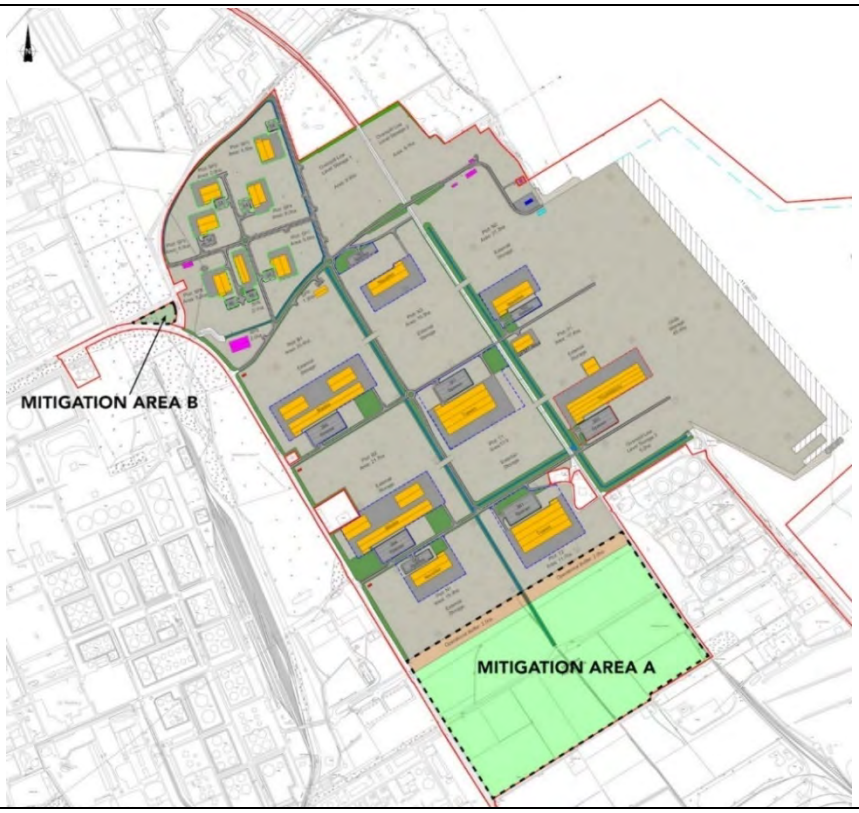


Figure 1.1 – The Consented Mitigation Sites – the red line indicates the Order limits
(Area A comprises 16.7ha core of ecological habitat with 150m buffer strips, total area 52.3ha)

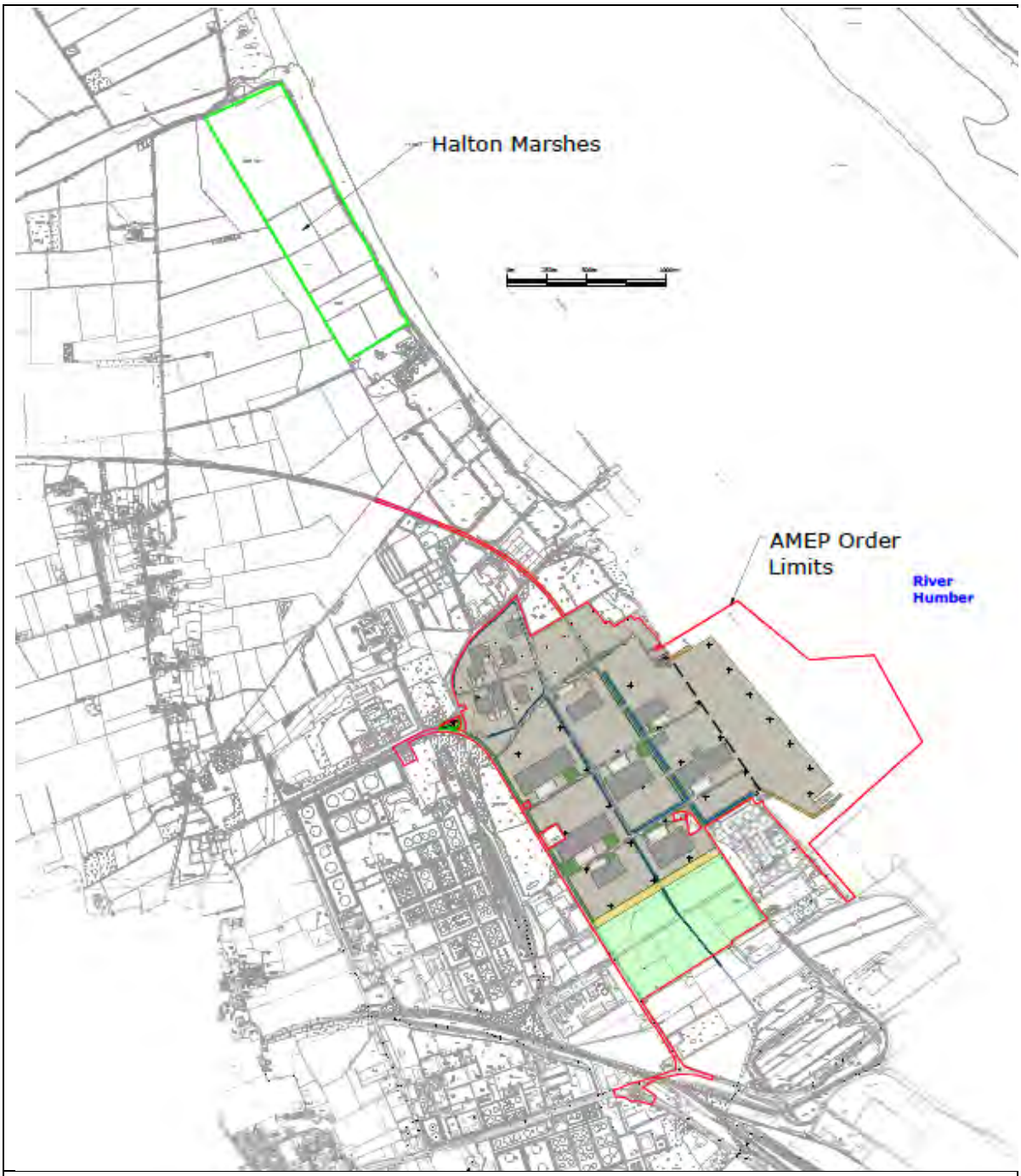


Figure 1.2 – Location of Halton Marshes in relation to AMEP

1.3 APPLICATION FOR NON-MATERIAL AMENDMENT

1.3.1 The principal purpose of the application for the non-material change is to re-site Area A to Halton Marshes in order to co-locate the following three areas of ecological mitigation (that the Applicant is under a duty to provide):

- Mitigation Area A, as part of the DCO;
- The area of Over Compensation, as part of the DCO; and
- 12 ha of the 32 ha of wetland required by the ALP planning permission.

1.3.2 On 8 May 2017, North Lincolnshire Council granted planning permission (planning reference PA/2016/649) for the development of 52ha of core ecological habitat at Halton Marshes to include the areas described above. This development is known as Halton Marshes wet grassland, or, adopting the acronym, HMWG. Construction commenced in May 2018.

1.3.3 The details of how the ecological mitigation would be provided at HMWG are more particularly shown in Figure 1.3 below.

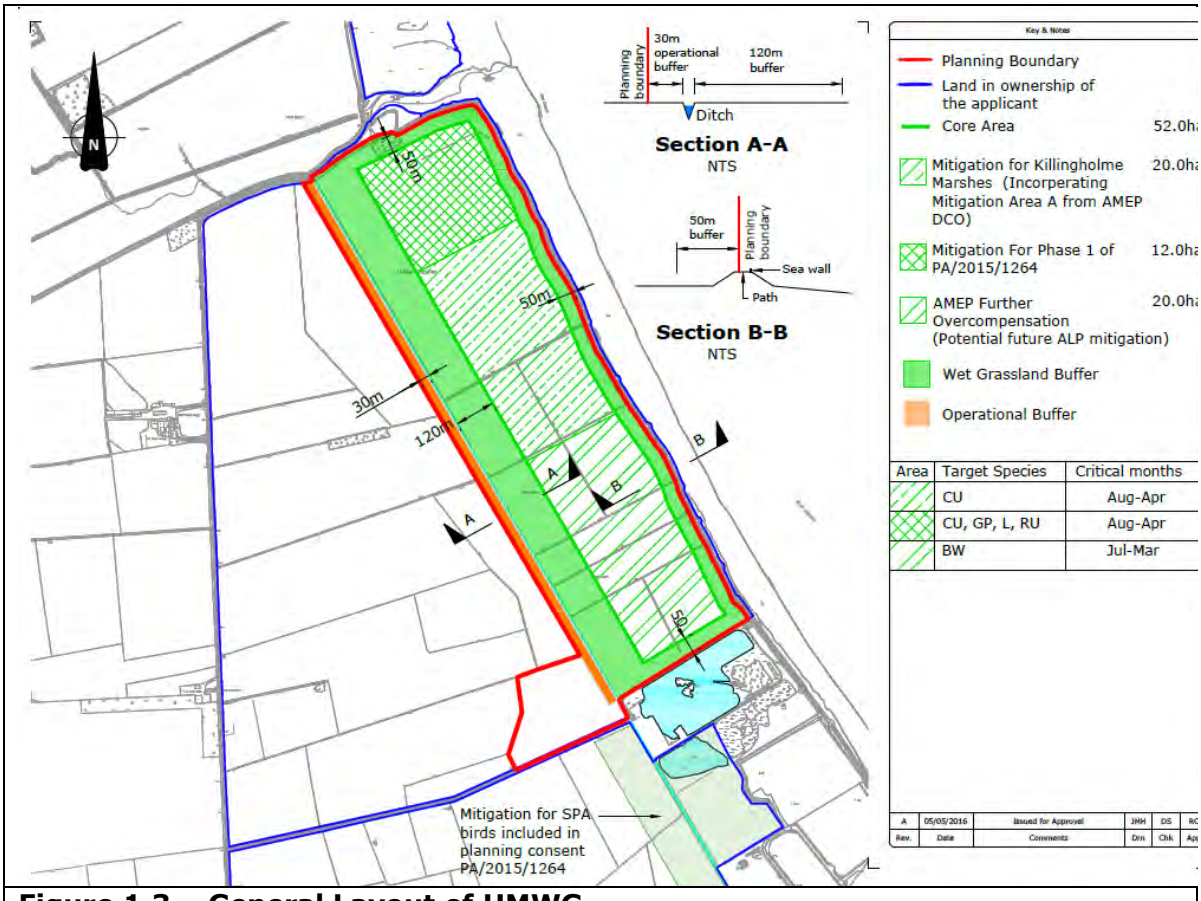


Figure 1.3 – General Layout of HMWG

1.3.4 As planning permission has been secured for HMWG, the requisite permissions are in place to re-site Area A to HMWG, provided consent is granted by the Secretary of State for the non-material amendment to the DCO.

1.3.5 HMWG can provide equivalent mitigation to Area A and the Applicant is therefore seeking approval for the relocation of Area A to an alternative location at HMWG.

1.3.6 As HMWG is outside of the Order Limits the re-siting cannot be approved by the local planning authority under the DCO requirements and therefore an amendment is needed to the DCO itself. As such, a non-material change application is required to consent to amendments to the DCO.

1.4 THE FUNCTIONAL REQUIREMENTS OF AREA A

1.4.1 The particular functions of Area A are detailed on the approved DCO application drawing AME-02007-A, which states that:

'*Area A will provide habitat for mitigation for wintering waders, eg. curlew, the loss of Station Road Local Wildlife Site, bats and breeding birds.*

The primary focus of Area A will be the creation and enhancement of wet grassland for wintering waders however measures to enhance the habitat for other species will also be taken.

Habitat creation, enhancement and restoration measures:

- *arable fields converted to grassland;*
- *wader scrapes that are shallow and variable depth, at least 100m from field boundaries;*
- *selected existing hedgerows will be removed to create an open aspect for wintering birds;*
- *foraging habitat for bats, low shrub/scrub will be located around the margins;*
- *1.7ha (at least) of neutral grassland to mitigate for loss of Station Road Local Wildlife Site;*
- *tussocky swards will be encouraged which provide habitat for nesting Skylarks and Meadow Pipit, and*
- *Clearance of surrounding vegetation where it is resulting in over-shading, vegetation surrounding the water which provides cover from predators (eg rough grassland) and food for water voles will be encouraged'.*

2 PROPOSED CHANGE

2.1 REASONS FOR THE PROPOSED CHANGE

2.1.1 The principal factors driving the proposed non-material change can be summarised as follows:

- **Optimisation of Disparate Mitigation and Compensation Measures**
    - The Applicant has to provide ecological habitat in accordance with the approved application drawings listed in the DCO, and under its planning conditions for the ALP.
    - Under the DCO, mitigation is to be provided in part within Area A, which is to provide a core area of 16.7ha of wet grassland habitat. In granting the DCO the Secretary of State also required the Applicant to provide the Over Compensation habitat for Black Tailed Godwits (BTGs).
    - As noted earlier, the Applicant also has approval for the development of ALP and a further 32ha of core ecological mitigation is required to mitigate for the impact of ALP on SPA birds, of which a minimum 12ha is required to be provided at Halton Marshes.
    - The Applicant, in considering its obligations to provide ecological mitigation for both the Able Marine Energy Park and ALP considered whether there would be benefits to providing a single large core area of 52ha, amalgamating the requirements of these schemes. The Applicant considered that relocating Area A to within Halton Marshes would offer the same benefits to those assessed as part of the environmental assessment for the DCO but could also offer a more attractive habitat for species overall than three individual and smaller parcels of land. In discussions with NLC and Natural England this approach was supported.
- **Optimisation of land for Economic Development**
    - If mitigation was to be provided as three separate areas then the land required to buffer the required core areas is significantly greater than if the core areas were combined. By combining the three core areas, a greater amount of land is available for future economic development.

2.2 THE PROPOSED AMENDMENT

2.2.1 The Applicant seeks to re-site Area A from within the Order Limits to Halton Marshes in accordance with the HMWG planning approval and therefore change the certified drawings that accompany the DCO and introduce a new drawing.

2.2.2 The changes to the certified DCO drawings for which the Applicant seeks approval are summarised in Table 2.1 below.

Drawing No.	Brief Description of Change
AME-02006	Mitigation Area A and associated Operational Buffer are deleted *in-toto*.
AME-02007	Original references to Mitigation Area A and associated Operational Buffer deleted
AME-02008	Mitigation Area A and associated Operational Buffer deleted *in-toto*.
AME-02010	Mitigation Area A and associated Operational Buffer deleted *in-toto*
ALP-002-00011A	New Drawing: Halton Marshes Wet Grassland Layout Core Areas and Buffers

Table 2.1: Summary of Changes to the DCO Drawings

2.2.3 The Applicant submits with this application revised drawings to re-site Mitigation Area A to HMWG.

2.2.4 The re-sited Area A will replicate the functional requirements repeated in paragraph 1.4.1 above.

3 SUPPORTING ENVIRONMENTAL INFORMATION

3.1 GENERAL

3.1.1 Table 3.1 of this report demonstrates that the environmental impact of re-siting Area A will not be materially different to that described in the environmental statement (ES) prepared for the DCO.

3.1.2 The basis of the design for HMWG, including a discussion as to how it addresses the particular ecological requirements for Area A, is set out in a Feasibility Study prepared by JBA Consultants which is included at Appendix A. Figure 3.1 below illustrates the wetland creation proposed in the southern half of the site, and the location of the Northern Field which will generally be left as existing.

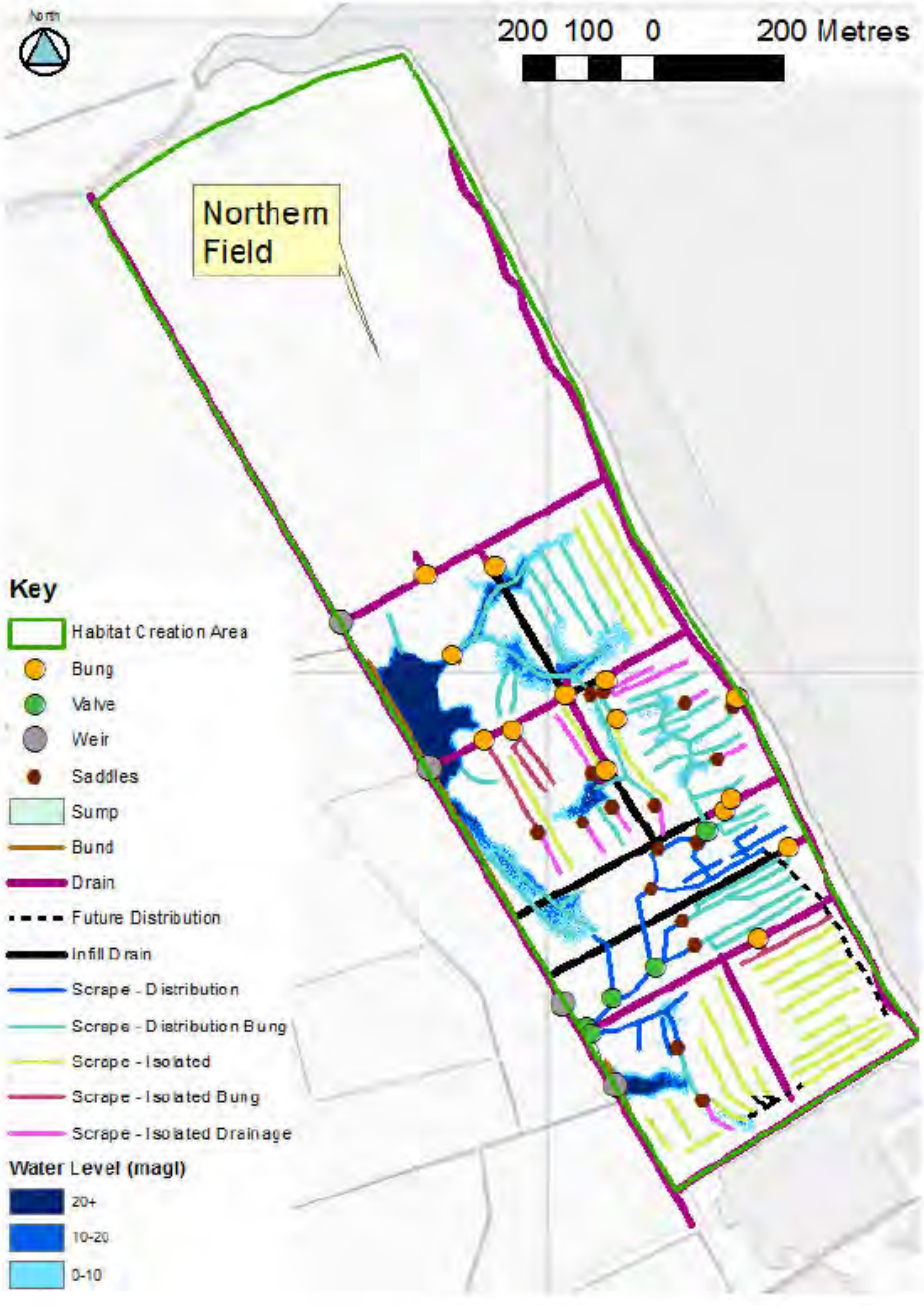


Figure 3.1: Abstract of Figure 6-9 from JBA Report

3.1.3 With respect to the particular requirements of Mitigation Area A, the HMWG scheme provides for the creation of suitable habitats for curlew (see for example Table 6.3 of the JBA Report) and for the creation of tussocky swards (promoted by cattle grazing) and neutral grassland.

3.1.4 Due to the low permeability nature of the clay deposits on the site, the HMWG scheme design focuses on the creation of a series of long linear scrapes, sufficiently deep to persist through the target periods of the year for curlew. To increase the robustness of the scheme, the design allows for topping up of water by pumping from the existing ditch that flows along the south western perimeter of the site.

3.1.5 To ensure that the site does not experience excess flooding in the winter, a series of bungs and weirs can be adjusted to allow the site to effectively drain during this period. The engineered elements of the scheme are complimented by a series of vegetation management elements, including, hedge removal, screening, reseeding, and grazing management, all being consistent with the functional requirements of the terrestrial mitigation requirements for AMEP.

3.2 HMWG PLANNING APPLICATION DOCUMENTS

3.2.1 Details of the consented proposal for HMWG are shown on the following drawings which were approved by the LPA and are listed in the Decision Notice for HMWG, refer to Appendix B:

ALP-002-00003 A Halton Marshes Wet Grassland Planning Application Boundary

ALP-002-00006 C Halton Marshes Wet Grassland Topographical Survey

ALP-002-00011 A Halton Marshes Layout Core Area & Buffers

ALP-002-00012 A Halton Marshes Wet Grassland Proposed General Arrangement

ALP-002-00013 A Halton Marshes Wet Grassland Planting Plan

ALP-002-00014 A Halton Marshes Wet Grassland Sections & Details

ALP-002-00016 A Halton Marshes Wet Grassland Schematic Layout of Scrapes

ALP-002-00017 A Halton Marshes Wet Grassland Sight Line Sections

3.2.2 The site is protected from fluvial flooding by the existing flood defence and planning consent PA/2015/1264 includes permission for Able to carry out works to maintain these defences.

3.3 HMWG APPROPRIATE ASSESSMENT

3.3.1 In accordance with the Conservation of Habitats and Species Regulations 2010, the LPA (North Lincolnshire Council), before granting consent for HMWG, undertook an appropriate assessment (AA) of the HMWG project to assess if the proposal would give rise to an adverse effect on the integrity (AEOI) of the Humber Estuary European Site. The AA concluded that the proposals, including their intended purpose of providing mitigation habitat for SPA birds that would be displaced by AMEP (in place of Area A), would not result in an AEIO on the European Site.

3.3.2 The AA undertaken by NLC prior to granting planning permission for HMWG is included in Appendix C. Relevantly the AA concluded that:

'(t)*aking into account Natural England advice and the recorded commuting distances for curlew, it is reasonable to conclude that the mitigation for loss of feeding, roosting and loafing habitat for curlew from Killingholme Marsh, that would have been provided by Area A, can effectively be delivered by the provision of 20 hectares of core habitat, along with appropriate buffers at HMWGS*.'

3.4 REVIEW OF THE AMEP ENVIRONMENTAL STATEMENT

3.4.1 The ES that accompanied the DCO application was written by a team of relevant experts that were co-ordinated by Able UK Ltd. The ES was presented in two volumes: Volume 1 reported on the development of AMEP on the south bank of the Humber estuary, whilst Volume 2 reported on the development of the compensatory measures on the north bank.

3.4.2 Consideration has been given to whether the proposed change to the authorised project would give rise to any:

(a) new significant effects that were not identified in the ES for the authroised project; or

(b) materially different effects (positive or negative) when compared to the effects set out in the ES for the authorised project.

3.4.3 The Applicant has also considered whether the proposed change would constitute 'EIA Development' for the purposes of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. The changes do not constitute either Schedule 1 development or Schedule 2 development. Paragraph 13 of Schedule 2 provides that a change or extension to a Schedule 1 development which has already been authorised will be Schedule 2 development only if "the change or extension may have significant adverse effects on the environment". In considering whether or not that is likely, the changes are not to be assessed in isolation. They fall to be considered by looking at the overall effect of the proposed change on the project, and identifying whether the whole, as modified, has or is likely to have other significant effects which need to be taken into account (i.e. significant effects which were not identified in the original assessment) (*R (Baker) v. Bath and North East Somerset Council [2009] EWHC 595 (Admin) at paragraphs 22-23 and 44-45*).

3.4.4 The proposals at HMWG for which planning permission was sought (and attained) did not, in fact, constitute EIA development.

3.4.5 The Applicant, with input from ERM, who prepared Volume 1 of the the ES that accompanied the original DCO application, has considered the environmental issues which were previously reported in that ES. Table 3.1 considers each of the aspects within the original ES and the materiality of the re-siting of Area A to HMWG on the environmental impacts assessed within the original DCO application.

3.4.6 There are some subject topics covered in the original ES where the environmental impacts assessed are entirely independent of the particular location of Area A, and these have been identified as such in Table 3.1 and not considered further.

TABLE 3.1: Summary of Environmental Impacts		
ES Chapter	**Title**	**Materiality of the Re-siting of Area A on the EIA undertaken for the approved DCO, and reasoning**
7	Geology, Hydrogeology and Ground Conditions	No material change. Area A and the HMWG are within the same locality, share the same Agricultural Land Classification (Grade 3) and have similar geology and ground conditions. Neither have any recorded contamination. Both sites have the same baseline characteristics and the design approach would be broadly the same at both sites.
8	Hydrodynamic and Sedimentary Regime	No material change. Impacts on the hydrodynamic or sedimentary regime within the estuary are considered to be independent of the siting of Area A.
9	Water and Sediment Quality	No material change. Construction at either Area A or HMWG has the potential to impact on surface water drains. In each case controls to reduce the impacts would be the same and mitigation required identical.
10	Aquatic Ecology	No material change. Impacts on aquatic ecology are considered independent of the siting of Area A.
11	Ecology and Nature Conservation	No material change. The same functional requirements as proposed at Area A are going to be implemented at HMWG and are considered to have equal mitigation value. Natural England is supportive of the HMWG approach to offer a combined mitigation area. The AA confirms that the new site at HMWG lies within the commuting distances for Curlew that use the AMEP site. Therefore it is a suitable location to re-site Area A without compromising the mitigation value for curlew. The AA also provides consideration and acceptance of the buffer areas proposed at HMWG. Whilst this is different to the 150m originally requested and proposed at Area A, the buffer distances are deemed acceptable.

TABLE 3.1: Summary of Environmental Impacts		
ES Chapter	**Title**	**Materiality of the Re-siting of Area A on the EIA undertaken for the approved DCO, and reasoning**
12	Commercial Fisheries	No material change Impacts on commercial fisheries are considered independent of the siting of Area A.
13	Drainage and Flood Risk	No material change. Area A will remain greenfield following the re-siting. Any subsequent development would require independent approval. Surface water run-off from HMWG will, if anything be reduced, but that is not considered to result in materially significant impacts or benefits.
14	Navigation	No material change Impacts on the navigation of shipping is considered independent of the siting of Area A.
15	Traffic and Transport Assessment	No material change. The traffic aspects associated with the HMWG have been accepted by NLC as demonstrated by the planning approval. Whilst alternative routes would be used for access to the HMWG as opposed to Area A, Tthe traffic movements associated with the two sites are comparable and the traffic impacts associated this aspect development are minor. In considering the materiality of this on the assessment completed for the DCO the Area A traffic movements are a minimal part of the overall assessment. Operational traffic during monitoring works is also minimal and again whilst an alternative route would be used to the HMWG compared to Area this is not considered a material change to the DCO application given the level of movement.

TABLE 3.1: Summary of Environmental Impacts		
ES Chapter	**Title**	**Materiality of the Re-siting of Area A on the EIA undertaken for the approved DCO, and reasoning**
16	Noise and Vibration	No material change. In siting the ecological mitigation at Area A or HMWG there would be one residential receptor in each instance on the boundary of the site. During construction the magnitude of impact would be the same at either Area A or HMWG, as would the mitigation approach which is essentially to adopt good working practices. In addition the number and sensitivity of the receptors likely to be affected is the same (albeit different properties) There is not considered to be any change in significance to that assessed in the DCO ES as a result of the re-siting. The potential construction noise impacts on birds at the HMWG site have been considered and deemed acceptable, with conditions, within the AA undertaken by NLC. There will be no difference in the operational impacts between Area A and HMWG.
17	Air Quality	No material change In siting the ecological mitigation at Area A or HMWG there would be one residential receptor in each instance on the boundary of the site. During construction the magnitude of impact would be the same at either Area A or HMWG, as would the mitigation approach which is essentially to adopt good working practices. In addition the number and sensitivity of the receptors likely to be affected is the same (albeit different properties) There is not considered to be any change in significance to that assessed in the DCO ES as a result of the re-siting. There will be no operational impacts locating the mitigation at either site.

TABLE 3.1: Summary of Environmental Impacts		
ES Chapter	**Title**	**Materiality of the Re-siting of Area A on the EIA undertaken for the approved DCO, and reasoning**
18	Historic Environment	None. Marine archaeology impacts are considered independent of the siting of Area A. With regard to terrestrial archaeology, both Area A and HMWG have been subject to archaeological investigation by augering and geophysical methods. Both sites have a limited potential for archaeological finds within the depth of the scrapes. In either case, this potential impact would be managed by appointing an archaeologist to undertake a visiting watching brief.
19	Light	No material change Construction will be undertaken during daylight hours whether mitigation is at the current Area A or HMWG. There is no operational lighting proposed once the mitigation is implemented and this is consistent at either Area A or HMWG.
20	Landscape and Visual	No material change. The visual assessment within the original DCO application was mainly focused on the presence of tall structures within the active AMEP area. Area A, which does not contain tall structures, and was not considered a significant part of the landscape and visual impact assessment undertaken. Therefore, the re-siting of area to HMWG will not materially change the original DCO assessment.
21	Socio-Economic	No material change. The socio-economic effects of constructing and operating the mitigation area are the same in either locations.
22	Aviation	No material Change There are no tall structures associated with the development of the mitigation area and this is the same in either Area A or HMWG.

TABLE 3.1: Summary of Environmental Impacts		
ES Chapter	**Title**	**Materiality of the Re-siting of Area A on the EIA undertaken for the approved DCO, and reasoning**
23	Waste	No material change. The DCO assessment in relation to waste mainly considered waste produced as a result of the active AMEP development. The waste generated at Area A is considered an insignificant part of this assessment. The re-siting of Area A to HMWG is considered to result in no material difference for either the level of waste produced or the significance of this aspect within the original waste assessment undertaken.
24	Health	None. The wellbeing of workers and residents is considered independent of the precise siting of Area A.

3.4.7 In conclusion, the re-siting of Area A to HMWG is not considered to give rise to any new significant effects that were not identified in the ES for the authorised project. Further, the re-siting is not considered to give rise to any materially different effects either during the construction or operation phases of AMEP, compared to those set out in the ES for the authorised project.

4 STAKEHOLDER ENGAGEMENT

4.1 CONSULTATION WITH NATURAL ENGLAND ON MITIGATION OPTION FOR AMEP

4.1.1 In light of the developments proposed by the Applicant in the area, discussions have been held between the Applicant, Natural England and North Lincolnshire Council in order to develop the concept of a unified approach to mitigation at Halton Marshes.

4.1.2 During the development of AMEP, Natural England confirmed in principle that mitigation for AMEP could be provided at Halton Marshes.

4.1.3 In 2013, the Applicant appointed Thomson Ecology to prepare outline proposals for ecological mitigation at Halton Marshes and held a workshop with Natural England, North Lincolnshire Council, RSPB and the Environment Agency on 23 June. Notes from this workshop are included at Appendix D.

4.1.4 In 2014, the Applicant appointed the Wildfowl and Wetlands Trust (Consulting) Limited to prepare alternative outline designs for ecological mitigation at Killingholme Marshes (the consented location of Area A) and at Halton Marshes. The proposals for Halton Marshes provided for a single block incorporating the mitigation for ALP and AMEP, including the Over Compensation. These alternative proposals were presented to Natural England at a meeting on 21 November 2014.

4.1.5 Natural England went on to provide written advice on the alternative proposals in accordance with their Discretionary Advice Service on 10 February 2015 and 29 July 2015 . In the latter correspondence Natural England again confirmed their agreement that the ecological mitigation for AMEP could be moved to Halton Marshes subject to a Habitats Regulations Assessment.

4.1.6 In January 2016, the Applicant appointed JBA Consulting to further develop the outline design of ecological mitigation at Halton Marshes. Details of the emerging design were discussed at subsequent meetings with Natural England before a planning application was submitted in May 2016 to North Lincolnshire Council.

4.1.7 All written correspondence with Natural England is included at Appendix D.

4.2 CONSULTATION BY THE LPA FOR THE HMWG PLANNING APPLICATION

4.2.1 A consultation on the proposal for HMWG was undertaken by North Lincolnshire Council as a consequence of the planning application submitted to the LPA by the Applicant. For ease of reference all consultation responses are included at Appendix E. Responses were received from the following:

- North Lincolnshire Council, Environmental Health (Commercial)
- North Lincolnshire Council, Public Rights of Way Officer
- North Lincolnshire Council, Highways Development
- North Lincolnshire Council, Development Control
- North Lincolnshire Council, Historic Environment Record
- Environment Agency
- Natural England
- Humberside Fire and Rescue Service
- Lincolnshire Wildlife Trust
- Royal Society for Protection of Birds
- Miss JA Winter, Winter's Farm, East Halton
- Mr John Richardson, Hill Top Farm, Lancashire

4.2.2 The principal comments are summarised in Table 4.1 below.

Table 4.1: Consultee Comments on the HMWG Planning Application

Consultees	Comments
North Lincolnshire Council Environmental Health (Commercial)	Proposed restrictions on working hours, which were subsequently incorporated into Condition 7 of the planning permission.
North Lincolnshire Council Public Rights of Way Officer	Acknowledged that no public right of way would be affected.
Humberside Fire & Rescue Service Access for Fire Service	Standard response, relating to access for firefighting.
North Lincolnshire Council Highway Development	No comments.
North Lincolnshire Council Environment Team	Supports the application in principle. A number of detailed queries raised which were resolved by further correspondence, and permitted completion of the appropriate assessment, Appendix C. 3.06 ha of neutral grassland should be provided to ensure long term development of 1.7ha. 4.26ha has been provided in the approved scheme
North Lincolnshire Council Historic Environment Record	Recommended three conditions, all of which were subsequently incorporated into the planning permission.
Environment Agency Principal Planning Adviser	Requested a Water Framework Directive Screening assessment. This was subsequently provided and the report accepted. Recommendation that former boreholes within the site are de-commissioned. This was incorporated into Condition 6 of the planning permission. The works should not impact or hinder the delivery of flood risk management improvement works. A suitable access strip has been left between the development and the sea wall. The works may require an Environmental Permit due to proximity of the flood defence. Subsequently agreed not required as works too remote from the defence.
Natural England	Raised a number of detailed comments but noted that an Environmental Management and Monitoring Plan should be developed to show how the requirements of Mitigation Area A will be met. (See Section 4.3 below). Addressd in Condition 9 of the planning permission.

Table 4.1: Consultee Comments on the HMWG Planning Application	
Consultees	**Comments**
Lincolnshire Wildlife Trust Conservation Officer	Welcomed the provision of wet grassland habitat. Raised need for long term management; this is addressed by Conditions 9, 10, 11, 14 and 15 of the planning permission.
RSPB Conservation Officer	Recognised that the application '*goes some way to meeting the mitigation requirements for the ALP and AMEP developments'.* Repeated a number of arguments they had put before the Examining Authority during the DCO Hearings and in written submissions, principally regarding the value of grassland habitat to BTGs. Nevertheless, the Secretary of State decided that wet grassland should be provided at Halton Marshes. Wished to see the establishment of a Steering Group to oversee the development; this suggestion has been incorporated into Condition 15 of the planning permission. Advised that the LPA could not itself approve amendments to DCO plans that provided for changes outside of the Order Limits.
Miss JA Winter, Winter's Farm, East Halton	Did not want the development to be used for wildfowling. Addressed by Condition 16 of the planning permission.
Mr John Richardson, Hill Top Farm, Lancashire	Concern that the development would '*destroy*' Winter's Ponds, by promoting saline ingress.

4.2.3 As noted in Section 3.3, North Lincolnshire Council's appropriate assessment agreed that the HMWG scheme, if built in lieu of the Area A, would ensure AMEP avoided having an adverse effect on the integrity of the Humber Estuary European site.

4.3 TERRESTRIAL ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (TEMMP)

4.3.1 In accordance with the DCO, Schedule 11, Requirement 19(3),

The authorised development must not commence until a terrestrial environmental management and monitoring plan, reflecting the survey results and ecological mitigation and enhancement measures included in the environmental statement, has been submitted to and approved by Natural England after consultation with the Environment Agency and the relevant planning authority.

4.3.2 The TEMMP for AMEP was approved by Natural England on 30 November 2016 and envisages Area A in its original position. The re-siting of Area A would be

subject to a revised Terrestrial Environmental Management and Monitoring Plan to be approved by Natural England under Schedule 11, paragraph 19(3) of the DCO. A draft TEMMP that takes into account the re-siting of Area A to Halton Marshes has been commented upon by Natural England and is included in Appendix F.

4.4 CONCLUSION

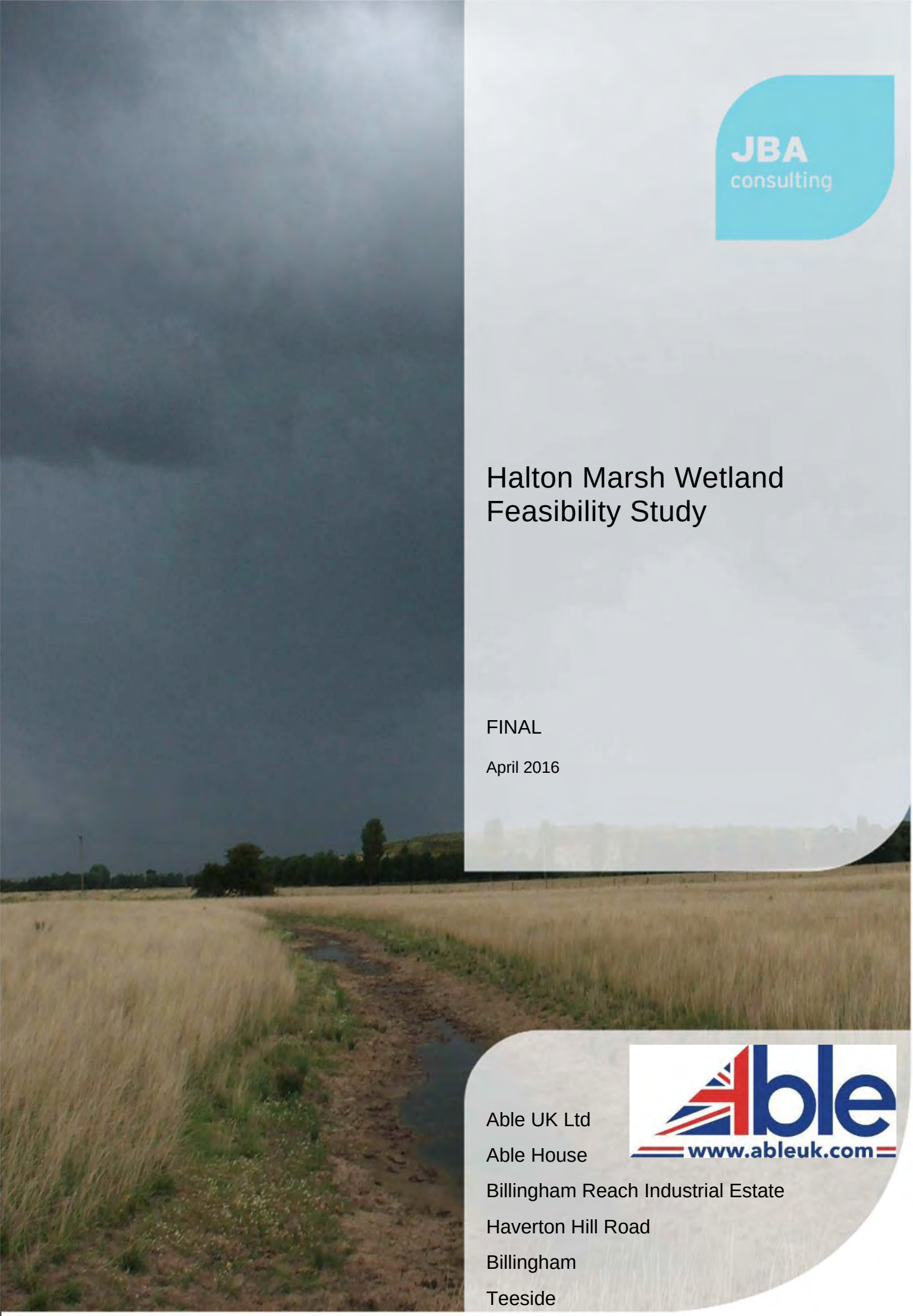
4.4.1 The Applicant seeks to re-site the mitigation area provided at Area A within the Order Limits to Halton Marshes and therefore amend the certified drawings that accompany the DCO and introduce a new drawing.

4.4.2 The re-siting of Area A is not considered to give rise to any new, significant or materially different effects compared to those assessed and reported within the ES for the approved DCO.

4.4.3 The re-siting of Area A is considered to be a non-material amendment to the DCO.

APPENDIX A

'*Halton Marsh Wetland Feasibility Study*', JBA Consulting, April 2016



Halton Marsh Wetland Feasibility Study

FINAL

April 2016

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Contract

This report describes work commissioned by Richard Cram, on behalf of Able UK Ltd, by an e-mail instruction dated 22nd January 2016. Able UKs representative for the contract was Richard Cram. Alex Jones and Kieran Sheehan of JBA Consulting carried out this work.

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Purpose

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1 Introduction

1.1 Project Background

Able UK Ltd are required to provide ecological habitat on the south bank of the Humber Estuary to both mitigate and compensate for development of the Able Marine Energy Park (AMEP) and to mitigate for the development of Able Logistics Park (ALP). Able UK wish to provide a single site that provides for all the ecological habitat required. The Halton Marshes site is owned by Able UK and comprises an area of 85.3ha consisting of arable farmland on reclaimed saltmarsh supplemented by an additional 4.9ha operational buffer on its western boundary.

This report aims to detail the process of developing a wet grassland scheme design to fulfil the temporary and permanent spatial requirements for habitat for a number of target bird species. The broad requirements for the habitat have previously been developed in consultation between Able UK Ltd, Natural England and the RSPB.

JBA has undertaken this work in accordance with our proposals to Able UK Ltd dated 3rd December 2015 and 1st February 2016 in order to develop a water balance for the site and an outline wetland design.

1.2 Report Structure

The report has the following structure:

- Section 2 - Ecological Requirements;
  - This section outlines the target species the site should attract, their requirements, and the spatial extent of habitats needed.
- Section 3 - Topography, Hydrology, Geology and Hydrogeology;
  - This section outlines the physical parameters and background information that informed the wetland design process.
- Section 4 - Design Principles;
  - This section analyses the findings of Section 3, to identify the principles on which a successful wet grassland scheme on this particular site should be based.
- Section 5 - Site Constraints;
  - This section outlines factors which should control and constrain the practical implementation of a scheme on this site.
- Section 6 - Design Options;
  - This section outlines an options appraisal process for a series of potential wet grassland designs and then presents in detail the preferred option.

1.3 Data Sources

The data used in the study were obtained from the following sources;

- Topography and general mapping:
  - OS Open Data, Terrain 50 DTM
  - 1m LIDAR DTM
  - 2m LIDAR DTM
  - Aerial photography (Google Earth and Bing Maps)
- Climate:
  - Flood Estimation Handbook (FEH) and CD-ROM (CEH, 2009)
  - Met Office website
  - MORECS (Met Office Rainfall and Evapo-transpiration Calculation System) data for Square 101.
- Geology and Soils:
  - BGS digital geology mapping

- BGS online borehole database (BGS website)
- BGS online Lexicon (BGS website)
- 1:250,000 soils mapping (Soil Survey of England and Wales, 1983)

- Hydrogeology:
  - Aquifer classification (Environment Agency website)
  - Groundwater vulnerability (Environment Agency website)
  - Source Protection Zones (Environment Agency website)
  - Licensed abstractions (Environment Agency website)
  - Groundwater quality (Environment Agency website)
- Other information relating to the site:
  - Wetland and Wildfowl Trust (March 2015), Halton Marshes Outline Design.
  - Thomson Ecology (October 2013), Statement of Design Principles - Halton Marshes Wet Grassland.
  - Hannah, Reed and Associates Limited (October 2007), Able Humber Pots Facility - Surface Water Drainage Statement.
  - Layout proposals for the site and the surrounding area provided to JBA by Able UK Ltd.

2 Ecological Requirements

2.1 Introduction

North Lincolnshire Planning Consent PA/2015/1264 includes for land at Halton Marshes to be developed as mitigation for loss of coastal farmland when the associated Able Logistics Park is constructed on the adjoining land to the south and west. The principal species impacted are Golden Plover, Lapwing, Curlew and Ruff.

The Development Consent Order for AMEP includes for land at Killingholme Marshes to be provided as mitigation for Curlew.

The Secretary of State's appropriate assessment for AMEP, took account of 38.5ha of land at Halton Marshes being provided as part of the compensation for the loss of inter-tidal foraging habitat on Black-tailed Godwits.

There has been significant previous dialogue between Able UK Ltd, Natural England and RSBP on the nature of the ecological habitat required on the site and the areas that are required in order to ensure that the land is managed in such a way as to provide suitable habitat to the target species noted above. The most recent correspondence from Natural England to Able UK Ltd in relation to the wet grassland creation scheme was received in November 2015.

In addition to the target species noted above, the main habitats that will be created will also benefit other species of wading birds, some of which use the nearby areas on the estuary for roosting, foraging, breeding or on passage. A number species breed in the area whilst others only utilise the area for wintering or on passage. In some cases the same species will use the land for all of these purposes, although the populations doing this may be different. The competing requirements of the target species makes the development of a scheme for this area of land complex. This project aims to deliver a solution to the multi-factorial requirements and provide a way forward acceptable to all parties.

2.1.1 Able Logistics Park (ALP)

ALP is a new development to the north of Killingholme that was initially granted planning permission by North Lincolnshire Council in July 2013 (PA/2009/0600), and further approved with revised conditions in February 2016 (PA/2015/1264). The area within the site proposed for ecological enhancement lies mainly to the east of a linear drain at the foot of the slope to the west as shown in Figure 2-1. The current size of the habitat creation area is 85.3ha, of which 52ha is to be core area for the reasons explained in paragraph 2.2 below.

The remainder, 33.3ha, will provide a wet grassland buffer to protect the core area from significant disturbance. An operational buffer to the west of the drain will be provided, restricted to non-disturbing activity. Buffer areas are also designed to partially screen the site from existing sources of disturbance, such as the footpath along the Humber flood embankments and the fishing ponds (known locally as Winters Ponds) to the south.

Figure 2-1 Halton Marshes Wet Grassland Creation Site

2.1.2 Able Marine Energy Park (AMEP)

This is a related development by Able UK Ltd to the south of the ALP development, which was granted development consent by the Secretary of State for Transport on the 29th October 2014 via *the Able Marine Energy Park Development Consent Order 2014* ('the DCO').

Part of the mitigation for the loss of habitat associated with this development was the retention and enhancement of an area of existing habitat at South Killingholme Marshes as shown in Figure 2-2. This area, commonly referred to in the DCO application as 'Mitigation Area A' contains a core area of 16.7ha, habitat buffers and a sown neutral grassland area of 1.7ha. As part of the proposals for the new site at Halton Marshes, Able UK proposes that the 16.7ha of core land for Curlew is transferred to Halton Marshes and the land at South Killingholme be released for development. The principle of this was first supported by Natural England in correspondence dated 28 October 2011, refer to Appendix E. To mitigate for any further development on Killingholme Marshes, in addition to AMEP, it is proposed that the core area provided at Halton Marshes is increased to 20ha so that it provides for mitigation not just for AMEP, but for any such further development on Killingholme Marshes also.

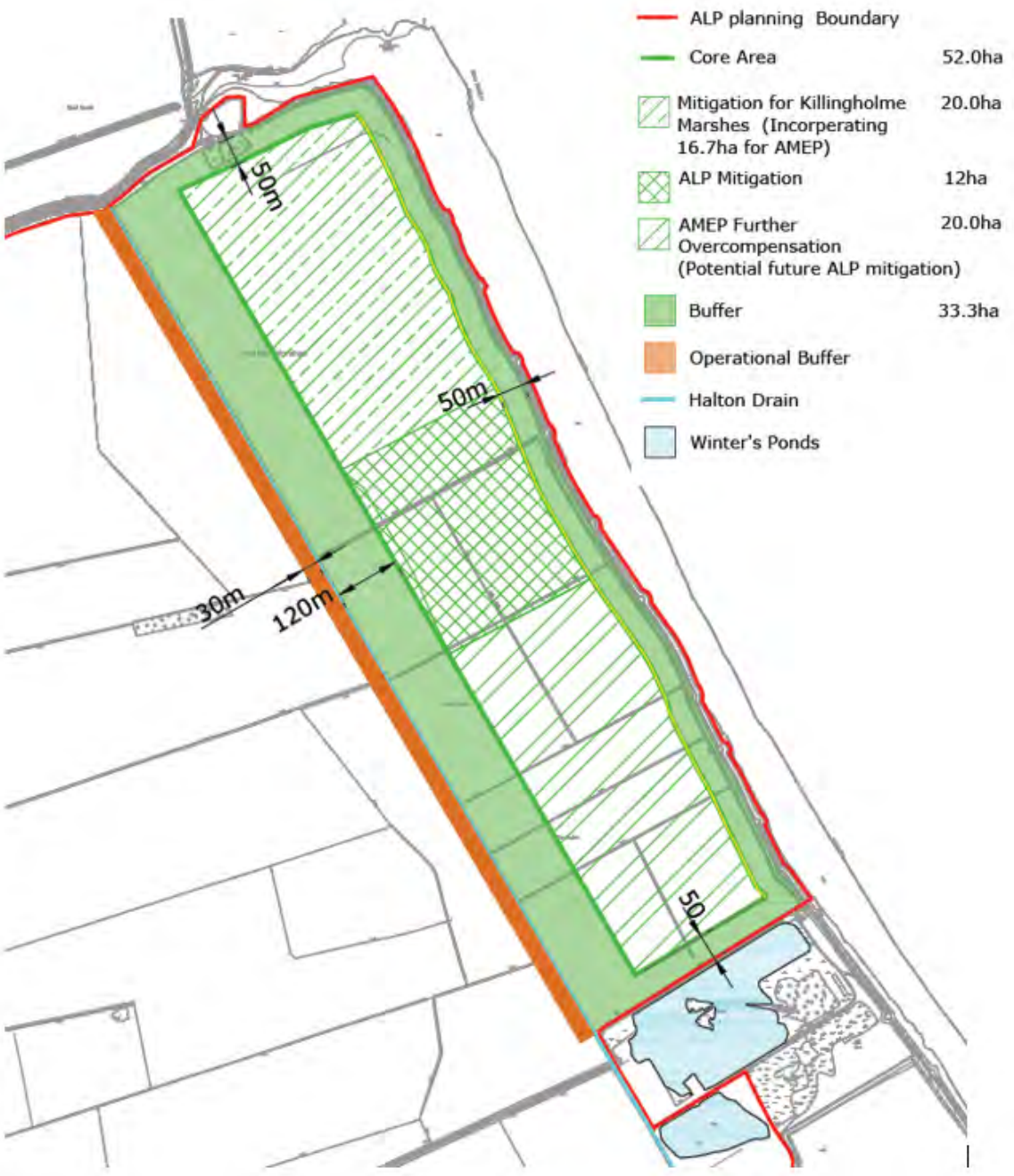
Figure 2-2 Killingholme Marshes Wet Grassland Creation Site

2.2 Consultation

Able UK Ltd have had extensive consultation with both the Royal Society for the Protection of Birds (RSPB) and Natural England on the proposals for the Halton Marshes wet grassland creation project. These consultations began in 2011, however, it was only in June 2013 that firm proposals for moving Mitigation Area A to Halton Marshes were prepared. This essentially set in motion a new round of consultations which has now resulted in the following statistics for the wet grassland creation scheme:

- The core area at Halton Marshes is: 12ha for mitigating Phases 1a and 1b of the ALP development (that is the development South of the redundant railway line mentioned in the Habitats Regulations Assessment (Taylor, 2015); 20ha for Killingholme Marshes (incorporating the 16.7ha of Mitigation Area A), and 20ha for foraging Black-tailed Godwit *Limosa limosa islandica* that will be displaced from inter-tidal areas by AMEP
- In addition there is 31.6ha of wet grassland buffer and 1.7ha of neutral grassland that buffer these core areas, and 4.9ha of operational buffer making a total area of 90.2ha.
- The above areas are based on buffers of 150m width on the west (drain) side and 50m on the other three sides (see Figure 2-3)

Figure 2-3: Buffer and Core Area (modified from Able UK drawing AME-001-00042 Rev G)



Within these core areas as well as the adjoining buffer areas there are a number of requirements that need to be met to satisfy the needs of the target species. These are set out below:

- Wet grassland is required to mitigate for the loss of habitat for roosting and foraging Curlew *Numenius arquata*, displaced from both Halton and Killingholme Marshes. These birds require the amount of winter flooding to be limited as, if the area is excessively flooded, invertebrate biomass (especially earthworms) falls.
- Wet grassland as overcompensation for foraging Black-tailed Godwits displaced by AMEP; 20ha needs to be managed specifically for individuals that start to arrive in the late summer and early autumn. This will require the maintenance of wet conditions on the site at the driest time of the year in an area with low rainfall totals.
- Hedgerows within the site will need to be removed to ensure long sight-lines for the birds using the site.
- The wet, vegetated, ditch near the flood embankment on the east side of the site will need to be extended and enhanced to limit disturbance to the site from dogs running off the lead.
- The creation of a bank on the landward side of the ditch into which new bushes will be planted to create a new hedge, which will act as a partial screen between the site and the public footpath along the flood embankment.

The total areas for the scheme are shown in Table 2-1.

Table 2-1 Total Core Areas in Halton Marshes Wet Grassland Creation Scheme

Requirement: Core Area	Area Agreed (ha)	Area Proposed (ha)
Curlew	20.0	20.0
Lapwing/Golden Plover/Ruff/Curlew	12.0	12.0
Black-tailed Godwit	20.0	20.0
Sub-totals	52.0	52.0

2.3 Target Bird Species

The primary objective of the wet grassland site is to avoid consented development having an adverse effect on the integrity of the Humber Estuary SPA in respect of non-breeding Curlew, Lapwing, Golden Plover and Ruff, and to provide a foraging resource for passage and wintering Black-tailed Godwit that will be adversely affected by the development of AMEP.

This section outlines the year-round requirements for the target species.

Curlew

The Curlew is Britain's largest wading bird.

The appropriate assessment for ALP noted that Curlew currently use the ALP (Taylor, 2011, p. 28) site '*primarily for feeding throughout the passage and winter survey periods in January – March*'. The Environmental Statement for AMEP recorded that Curlew are present on Killingholme Marshes in significant numbers between September and March, and that the site is used for roosting as well as providing a feeding resource for the species. Accordingly the principal objective for Curlew is to provide a roosting and feeding resource between September and March.

Curlew breed in a number of habitats, including taiga, blanket bogs, wet meadows pastures and even arable fields (Mullarney, et al., 1999). In the UK they are present all year round and additional birds can also be seen on passage. In order to create optimum conditions for this bird at Halton Marshes this species requires damp pastures with some areas of rougher, tussocky grassland to nest in between April and July. Adult birds feed on earthworms, leatherjackets and arthropods whilst the chicks generally feed on arthropods gleaned from the surface (RSPB, 2008), often on the draw-down margins of ponds and scrapes.

In the winter the birds tend to feed around the coasts, usually on soft coast, such as estuaries (Holden & Cleeves, 2014), however, wave cut platforms on hard coasts are also utilised. At high tide the birds can be found on adjacent pasture and arable land and will continue to forage here when conditions are suitable.

Management on site will need to be via the control of water levels to achieve wetness at or near to surface level and good numbers of invertebrates, especially during the breeding

season. This will require cattle grazing to create a medium-long sward height (15-30cm), with shorter tussock areas (5cm) scattered around the site. Drier areas with a tall sward are also required to encourage nesting in the Spring after which the water levels can be allowed to drain down (RSPB, 2005).

Black-tailed Godwit

The Planning Inspectorate (2013) recommended that the East Halton Marshes scheme should be included as a compensatory measure to provide as much available feeding ground as possible, given the disagreement between Able UK, Natural England and the RSPB during the examination about how much food-stock was required to replace the existing resource at North Killingholme Marshes Able UK also proposed improvements to its design proposals for the site to benefit Black-tailed Godwit and other estuary birds by incorporating surface water features and islands in scrapes to serve as secure roosts in winter.

Accordingly, the principal objective for Black-tailed Godwit is to provide a feeding resource for on passage and over wintering flocks, this is the period between July and February.

Black-tailed Godwits are found around the coasts of Britain, especially soft coasts, such as estuaries, saltmarshes, mudflats and, occasionally, inland marshes (Mullarney, et al., 1999). The main concentrations are on the muddy estuaries and coastal grasslands of the north-west, south and south-east coasts of England, with important numbers on the Wash and in Northern Ireland (Holden & Cleeves, 2014). They also occur on passage and wintering birds from Iceland (ssp. *islandica*) can also be found in the UK (Mullarney, et al., 1999) on estuaries and areas of inter-tidal mud (European Communties, 2007). This is the sub-species found on the Humber Estuary. Black-tailed Godwits may also winter in freshwater habitats, including swampy lake shores, pools and flooded grassland (BirdLife International, 2016). In spring and summer feeds on insects. Also feeds on worms and small snails (Holden & Cleeves, 2014). Wintering birds in the UK arrive typically in august and September and post-breeding birds may also use these habitats in the summer and into the wintering period (Avibirds, n.d.).

In Britain, breeding Black-tailed Godwits mainly use lowland wet grassland that is prone to flooding, whereas in other parts of their range they will utilise mires, wet moorland, river valley fens and marshy margins of lakes (European Communties, 2007). Nesting begins in early April and the nest is well hidden in a tussock (Holden & Cleeves, 2014). The presence of flooded area is believed to be important for both roosting and for feeding, especially in the period leading up to breeding, and mown grasslands are selected over grazed pastures (European Communties, 2007) with areas with high grass and soft soil preferred, occasionally using sandy areas. It is believed that extensive farmland habitats are of critical importance for breeding Western European populations of Black-tailed Godwit: seasonally flooded grasslands are considered a critical habitat in Ireland (BirdLife International, 2016).

Breeding birds tend to favour areas with short, tussocky, easily probed turf and surface water within approx. 300m of the nest (English Nature, 1999) (RSPB, 1997). Nesting is largely controlled by water levels, but generally the first eggs are laid in mid-April (Seago, n.d.). The nest itself is placed on the ground in short, often in dense vegetation, and this typically consists of a shallow scrape 12-15cm in diameter, lined with a thick mat of stem grass, leaves and other available vegetation (BirdLife International, 2016). The chicks have a preference for taller vegetation (RSPB, 1997) and, once they have fledged, the adults and fledgelings may move to adjacent secondary habitat which are reported to more closely resembles that of their non-breeding range (BirdLife International, 2016). These include draw down areas around ponds and sewage farms, tidal marshes, mud flats and salt-water lagoons.

In terms of management the RSPB (1997) have set out three options for this:

- Best Option: Very high water table without surface flooding the previous winter
- Best Alternative: Grassland surface flooded during the previous winter
- Worst Option: Unflooded grassland with a low water-table

Ruff

Ruff were recorded on the ALP site between January and March. The appropriate assessment for the Able Logistics Park (Taylor, 2011, pp. 26-27) noted that wintering and passage Ruff use the site for '*feeding, roosting and loafing'*

This is an uncommon breeding species in the UK but it does breed on marshes, wet grass meadows, lakesides and seashores (Mullarney, et al., 1999). It tends to winter mainly in Africa but small numbers do overwinter usually on the coast in southern England (JNCC, n.d.). It is often seen on passage in small numbers and, at times, can form large flocks in the Spring where the males display in communal leks (Mullarney, et al., 1999).

In the breeding season the birds frequent lowland wet meadows which have been grazed in the summer and flooded in the winter (Holden & Cleeves, 2014). The nest is a shallow scrape on the ground and the food for the adults and chicks are insects and their larvae, especially flies, which can be found around the margins of muddy pools and lakes (Holden & Cleeves, 2014).

In terms of management the requirements are for grazed grassland that have been flooded in the winter but still retain areas of shallow water and draw-down zones along with drier areas with shorter grassland for lekking (RSPB, 1997) (English Nature, 1999).

Lapwing

The greatest numbers of lapwings are found on the Humber during the mid-winter period, mainly November to January. The appropriate assessment for ALP states that, '*recent surveys show a high proportion of records relate to both feeding and roosting on fields in the day*' (Taylor, 2011, p. 33).

This is a common breeding bird in the UK and is resident all year round. In the Summer it is found on the coast and in open country inland whereas in winter it is found in large flocks on farmland and marshes (Mullarney, et al., 1999).

Of the UK waders, it is the least dependent on wet conditions (English Nature, 1999) and it breeds mainly on farmland, especially in Spring sown crops (Holden & Cleeves, 2014). It also breeds on pastures and in wet grasslands and even in industrial estates (K Sheehan - pers comm), where there is bare ground and damp areas for chicks to forage (Holden & Cleeves, 2014). Breeding Lapwing require short swards (5cm) with scattered tussocks (15cm) and shallow surface pools nearby for feeding and these should draw down gradually ensuring there is always a muddy margin for the chicks to feed on a wide range of invertebrates (Ausden, et al., 2003) (RSPB, 2005). The nest is a scrape with a lining of grass or leaves.

Management for Lapwing requires the presence of a short sward (a maximum height of 15cm has been suggested) during the breeding season along with surface pools to serve as nursey areas (English Nature, 1999). Other authors have suggested shorter swards (RSPB, 2005) (Ausden, et al., 2003) in the region of 4 - 10cm in height during the breeding season with scattered tussocks up to 15cm in height to hide chicks. The surface should be kept damp with the water table being no more than 30cm below the ground with draw-down areas to provide feeding habitat for chicks and adults (Ausden, et al., 2003) (JBA Consulting, 2013).

Golden Plover

Large wintering flocks arrive on the Humber during November, with peak usage continuing into January (Cram, R. pers. com.). The appropriate assessment for ALP (Taylor, 2011, p. 30) states that, '*birds* (Golden Plover) *recorded in the hundreds are invariably roosting flocks; much smaller flocks of 10 or so are occasionally recorded feeding*', and that these flocks are generally '*observed between August – March*'.

This is a bird that breeds in the uplands and north of the country on blanket bog, heather moorlands and limestone grassland (Mullarney, et al., 1999) and feeds on the surrounding pastures (Holden & Cleeves, 2014). In the winter birds gather at favoured inland sites on lowland grassland or arable fields and often roost on ploughed fields, coastal marshes and estuaries (Holden & Cleeves, 2014) in the company of Lapwing. Damp areas are required – feed on cranefly larvae which require damp areas for survival. Likes dry ground (Mullarney, et al., 1999) and feeds on a variety of small creatures, especially beetles, earthworms (Holden & Cleeves, 2014) and cranefly larvae (BTO, n.d.).

Bats and Passerines

The loss of hedgerows will have a negative effect on bat species, however, the creation of wetlands and the planting of a hedgerow screen along the eastern edge of the site will improve the overall habitat heterogeneity and offer increased foraging opportunities.

Skylark *Alauda arvensis* and Meadow Pipit *Anthus pratensis* are found in large numbers on Halton Marshes (pers. obs), although the current conditions are sub-optimal as the vegetation has become tall and rank following the cessation or arable production. The introduction of grazing and the creation of a sward with a mosaic of different heights will benefit these species, however, there will be a need to ensure that areas of grassland remain dry during the breeding season.

The above requirements are summarised in Table 2-2

2.3.1 Summary of Requirements for Target Species

Table 2-2 summaries the requirements for target species through-out the year as described in the section above. The highlighted requirements relate to the specific objectives for the site as outlined in Section 2.2.

Table 2-2 Habitat and Management Requirements of Target and Non-target Species

Species	Timings			Management	Rationale
Target	February – June	July – September	October - January		
Black-tailed Godwit	Pools, tussocks and drier areas	Maintain pools of water	Avoid surface water	No winter flooding, taller, ungrazed swards	To allow foraging, roosting and to promote breeding
Lapwing	Pools and drier areas with tussocks	Water draw-down	Some surface water	Winter grazing/short sward	To allow foraging, roosting and to promote breeding
Ruff	Dry areas, tussocks and pools	Water draw-down	Winter flooding	Short, grazed grasslands	To allow foraging, roosting and to promote breeding
Curlew	Tussocks and soft ground	Water draw-down	Shallow winter pools	Short, grazed grasslands	To allow foraging, roosting and to promote breeding
Golden Plover	N/A	Drying surfaces	Dry areas essential	Winter grazing/short sward	To allow foraging and roosting
Non-target					
Redshank	Pools and drier areas	Maintain pools of water	Some surface water	Winter grazing/short sward	To allow foraging, roosting and to promote breeding
Snipe	Muddy patches and soft ground	Maintain damp soils	Some surface water and soft ground	Tussocky and rough grassland/ no winter/spring grazing	To allow foraging, roosting and to promote breeding
Meadow Pipit	Drier areas, short sward with small tussocks	Drier areas with a short sward	Drier areas with a short sward	Light spring grazing, summer cattle grazing	Foraging
Skylark	Drier areas, short sward with small tussocks	Drier areas with a short sward	Drier areas with a short sward	Light spring grazing, summer cattle grazing	Foraging Roosting Breeding
Bats	Hedgerows, trees, open water, hibernaculum	Hedgerows, roosts, open water	Hibernaculum	Grazing animals on site	Foraging

Note - as a result of the requirement for black tailed godwits to have standing water in August it is possible that breeding habitat may be created for other species as a consequence of the requirement to maintain water at drier times of the year.

2.4 Implications for habitat creation

The management requirements of the five target bird species are not always compatible, however, the size and nature of the site allows a degree of synergy between them with different parts of the site being managed preferentially for different species. In summary the principal requirements are:

- Mix of wet and dry areas in summer.
- Some areas of short grass and others with longer grassland as well as scattered tussocks (Curlew).
- Some areas of summer grazing (Ruff).
- Areas with no surface flooding in winter to promote foraging (all species).
- Dry areas in the winter for roosting (Golden Plover).
- Shallow surface flooded areas in summer (Lapwing).
- Areas of muddy margins in draw down areas (Lapwing).
- Areas which are inundated in winter (Ruff).
- Removal of hedgerows to eliminate predator posts (all species).

These are not mutually exclusive and more than one wader species will benefit from each requirement, even though the main species to benefit is shown.

2.5 Areas and Buffers

Figure 2-3 shows an indicative plan that illustrates how the separate parcels of land make up the total area of habitat required of the scheme. In general the primary habitat extending across the site (core and buffer) will be wet grassland.

All Earthworks will be set back from the main drain, the soke dyke along the eastern part of the site and at least 10m from the base of the sea wall.

In accordance with the guidance provided by Natural England, a buffer of 150m has been provided where adjacent land use could change. This buffer has been incorporated along the western perimeter. However, where the core area is otherwise adjacent to the SPA or Winter's Pond which has no development potential a buffer of 50m is proposed. A 50m buffer is considered sufficient to mitigate for the minimal disturbance arising to the east in combination with a screening hedge and a ditch to discourage dogs from entering the site from the footpath along the Humber flood embankments.

Along the northern margin of the site, the ALP development incorporates a landscaping bund that will further screen the site from any disturbance to the north. This will be augmented by the creation of 1.7ha of neutral grassland (MG5) in this area.

3 Topography, Hydrology, Geology and Hydrogeology

3.1 Introduction

This chapter describes the geology, hydrology and hydrogeology of Halton Marshes and the surrounding area.

3.1.1 Methodology

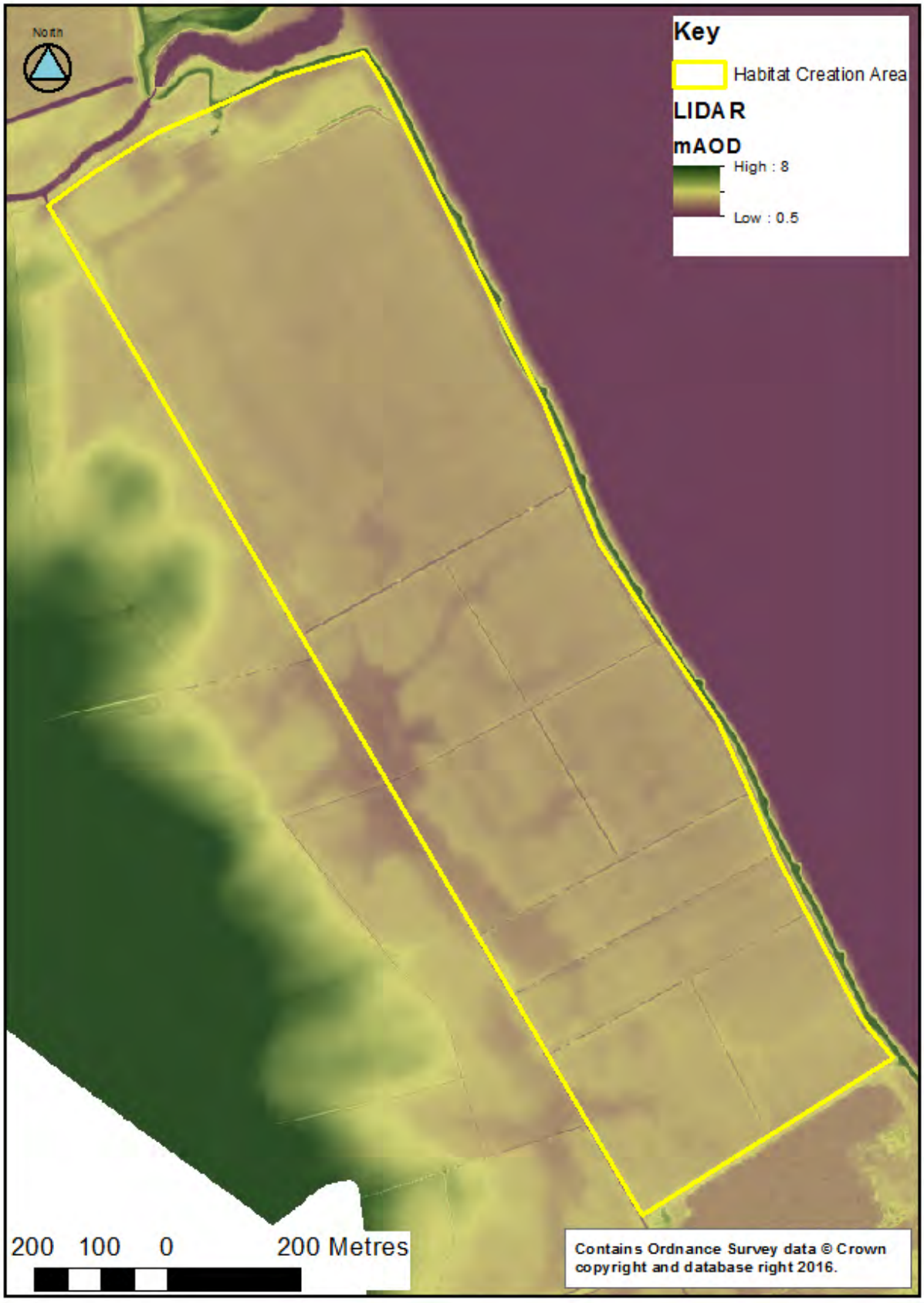
To inform this section, the feasibility study has involved:

- Desk-based study,
- Site walkover visits undertaken by JBA hydrogeologists and ecologist on 17th February 2016,
- Site investigation and monitoring works including shallow soil augering, water quality sampling and flow monitoring in the drain which was undertaken on the 24th February and 1st March.

3.2 Topography

The site lies at an elevation of around 2.6mAOD within a flat coastal plain, approximately 600m wide, running parallel with the Humber in a north-northwest to south-southeast orientation (see Map 1 (Appendix A) and Figure 3-1).

Figure 3-1: LIDAR Topography



The site lies within a small catchment. Inland of the coastal strip, the ground gently rises to a watershed at around 12mAOD, 2km from the coastline.

The coastal plain appears to be reclaimed tidal marshes, until recently used for arable agriculture. Palaeo-channel tidal creek features up to around 90m wide are evident within the micro-topography. This can be clearly seen as an area of darker shading in Figure 3.1 running broadly parallel to the western site boundary.

The coastal strip is protected through a sea defence. The top of this defence (wave return wall) is around 6mAOD.

3.3 Climate

The Flood Estimation Handbook (FEH) CD-ROM includes long-term average rainfall data for catchments in the UK. For the smallest catchment covering the majority of the site the Standard Average Annual Rainfall (SAAR) is 618 mm for the period 1961 - 1990 and 599 mm for the period 1941 - 1970 (CEH, 2009).

The water budget presented in Appendix D presents more information on the local climate.

3.4 Hydrology

The Humber Estuary lies to the east of the site.

The site lies within the Louth Grimsby and Ancholme catchment. The Environment Agency's Grimsby, Ancholme and Louth Catchment Abstraction Management Strategy (CAMS) (February, 2013) further subdivides the catchment, with the site lying within the catchment of Barrow Beck and Skitter Beck.

Skitter Beck (known for part of its reach as East Halton Beck) discharges to the Humber Estuary to the north of the site. Skitter Beck is a heavily modified water body which is currently regarded as having poor ecological quality and does not require assessment for chemical quality.

The coastal plain at Halton Marshes is dominated by a North East Lindsey Drainage Board (NELDB) adopted drain which forms the western boundary of the site which discharges north to Skitter Beck under a small road bridge. For the purposes of this study it is referred to as the main drain. The dimensions of the main drain are approximately 3m wide by 2m deep but it is deeper in the north, where it passes through higher ground.

The site itself is crossed by a number of drains which run at right angles to the site boundaries. These are typically circa 1m deep and 2m wide.

Immediately to the south of the site there are two of open water bodies which historic maps indicate are flooded former clay pits. The closest to the site is named Winters Pond.

3.4.1 Catchment Descriptors

The Flood Estimation Handbook (FEH) CD-ROM (CEH, 2009) provides a series of estimates of hydrological parameters for the site and catchment it lies in.

The Standard Percentage Runoff (SPR) is the percentage of rainfall responsible for the short term increase in river flow during and/or following a rainfall event (Boorman et al, 1995). The FEH CD-ROM gives the SPR for the site as 36.3%. This suggests that a large amount of rain falling on the catchment will pass rapidly into watercourses via overland flow or interflow (lateral flow through the soil).

The Baseflow Index (BFI) is the proportion of total streamflow made up of baseflow (mostly groundwater input). The FEH-CD approximates this, for the site, to be 0.506. This value suggests that baseflow makes up around half of total streamflow, which is a surprisingly high proportion of baseflow, given the relatively thick and low permeability nature of the drift deposits on site.

3.5 Geology

The geology at the site is summarised in Table 3-1, Figure 3-3 and Figure 3-3. A shallow ground investigation was undertaken by JBA hydrogeologists using a hand held auger. The auger logs are presented in Appendix B. These compliment additional auger logs presented in WWT 2015.

Table 3-1 Geology of Halton Marshes

Age	Formation	Member	Description	Thickness (m)
Quaternary		Tidal Flat Deposits	Clay At depth thin bands of gravel, sand and peat.	~13 m *
		Till	Outcrops on the slopes to the east of the coastal plain. Consists of boulder clay with bands of gravel and sands.	up to 17m thick on the high ground to the west ** The deposits wedges out towards the coastal plain.
Cretaceous	Burnham Chalk Formation	Upper chalk bearings	A weathered upper margin of the chalk consisting of broken chalk and "putty chalk"	~10 m**
		Un-weathered structured formation	White, thinly-bedded chalk with common tabular and discontinuous flint bands; sporadic marl seams.	~130 m ***
Sources: * BGS Online Borehole Archive BGS Ref TA12SW66 **BGS Online Borehole Archive BGS Ref ***BGS online lexicon of named rock units				

Figure 3-2 Geological cross-section

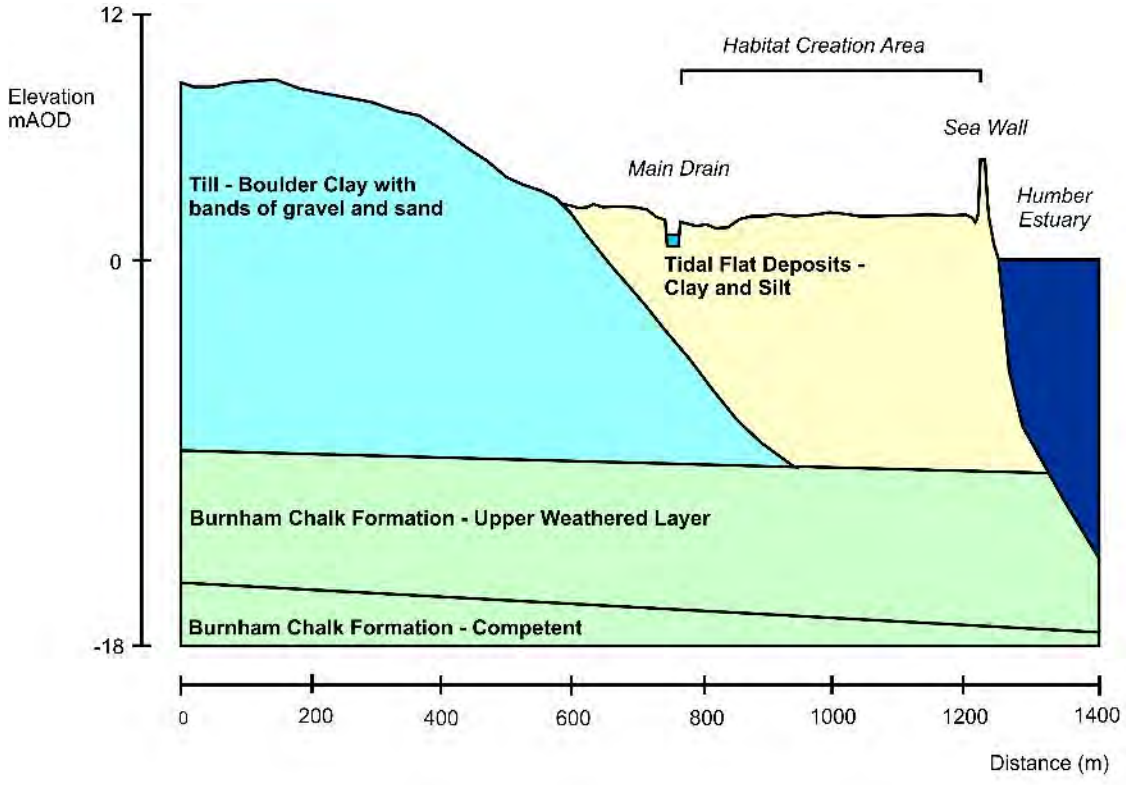


Figure 3-3: Superficial Geology

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3.5.1 Bedrock Geology

The bedrock beneath the site belongs to the Cretaceous Burnham Chalk Formation of the White Chalk Subgroup, and constitutes a white thinly-bedded chalk with common and discontinuous flint bands. The upper layer of the bedrock underlying the site constitutes chalk bearings which is a term used to describe a layer of fragmented chalk which occurs above the relatively un-weathered structured chalk. Local borehole logs (BGS Ref TA12SW63) suggest that the chalk bearings are approximately 10 m thick beneath the site.

3.5.2 Superficial (Drift) Geology

The near surface drift deposits are mapped to be tidal flat deposits by the BGS. These typically comprise consolidated soft silty clay, with layers of sand, gravel and peat. Undifferentiated beach and tidal flat deposits lie to the east of the site beyond the sea wall, typically comprising a more mixed deposit of clay silt and sand.

The augering across the site indicates that the upper marine alluvial deposits are dominated by clay and silty clay. Within the middle of the largest palaeo-channel some sandy clay deposits were identified.

Till (boulder clay) deposits outcrop on the slopes to the east of the coastal plain. Borehole logs available from the BGS GeoIndex (BGS Ref TA12SW63) suggest that the till is up to 17m thick on the higher ground to the west of the site. The till deposits thin towards the shore, and borehole logs (BGS Ref TA12SW66) in close proximity to the site suggest that the till may be absent on the coastal plain including beneath the site itself.

3.5.3 Soils

The soils beneath the site belong to the Newchurch 2 Soil Association which comprises deep stoneless mainly calcareous clayey soils. These are similar in nature to soil associations in which successful low permeability wet grassland revision schemes have be constructed along the east and south coast of England.

3.6 Historic Landfilling Activities

The dominant land use within the surface water catchment of the site is for arable farmland and as a result the overall contamination risk to the catchment is low. However, a number of landfill sites have been identified within the catchment using the Environment Agency's web based service "What's in Your Backyard" facility (see Figure 3-4). Details of these landfill sites are given in Table 3-2.

East Halton landfill site located closest to Halton Marshes is a historic landfill site which poses the greatest contamination risk as it has handled a number of waste types including household waste which typically comprises waste which can be subject to decomposition, and is therefore more likely to produce landfill gas and leachates. No information regarding the construction of the landfill sites was made available for this study and as a result it is not clear whether any engineering measures have been implemented to collect gas or leachate. Surrounding and containing the areas of landfill is a wider area of raised ground which appear from their morphology to be formed from made ground.

Water quality monitoring (see Appendix C) from the main drain for a broad range of potential contamination indicators (including ammoniacal nitrogen as an indicator of potential contamination from the nearby former landfill site) indicated limited evidence of surface water concentration.

Table 3-2 Landfill sites located within the site's surface water catchment

Site	Authorised / Historic	Waste first received	Last waste received	Nature of waste	Distance from site
East Halton	Historic	31 Dec 1967	31 Dec 1983	Inert, Industrial, Household, Special, Liquids/sludge	342m SE
North Kingholme Landfill	Authorised			Non-biodegradable wastes	575m SE
Clough Lane	Historic	23 Mar 1994		Inert waste	720m S

Figure 3-4: Landfill and Raised Ground

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3.7 Hydrogeology

The bedrock beneath the site is regarded as a Principal Aquifer by the Environment Agency (EA). This describes layers of rock that have a high intergranular and/or fracture permeability and therefore usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale (Environment Agency Online).

The tidal flat deposits are regarded as unproductive strata by the EA, this designation means that the deposits have a low permeability and negligible significance for water supply or river baseflow. The degree of soil gleying (an indicator of local water table height) identified in the auger survey, across the site, suggests that the furthest to which the water table falls is circa 1 to 1.5mbgl. The high proportion of gleyed material in mottled layer above that suggests that the water table regularly is at or near the ground surface. The upper 30cm of deposits, showed limited mottling. This is likely to be the result of ploughing disturbing the deposits rather than indicating the water table does not reached the surface (the site walk-overs in February and March identified significant amounts of standing water).

A limited number of field drains were observed discharging into the main drain. These are likely to change the hydrogeological nature of the upper marine deposit layer, increasing the bulk permeability of this layer.

The till deposits have been defined as a Secondary (undifferentiated) Aquifer by the EA. This category is assigned in cases where it has not been possible to attribute either a Secondary A or Secondary B category to the rock type. In most cases this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

3.7.1 Groundwater Source Protection Zones

There are a large number of groundwater source protection zones located to the south and west of the site. All abstractions to have an inner zone (zone 1), outer zone (zone 2) and a total catchment (zone 3). None of the defined SPZs lie within the surface water catchment defined for the site.

3.7.2 Groundwater Vulnerability and Water Quality

The groundwater beneath the site itself is regarded as belonging to a Principal Aquifer of high vulnerability. This high vulnerability classification is a function of the overlying soil type and does not take into account the overlying drift deposits. There is a significant thickness of tidal flat deposits on site (~13m) and these will help protect the aquifer from pollution at the surface, and also limit recharge to the underlying chalk aquifer.

The groundwater body beneath the site is named the Grimsby Ancholme Louth Chalk Unit and is currently regarded as having poor quantitative quality (i.e. the volume of water with the groundwater body is below ideal due to activities such as abstractions) and poor and deteriorating chemical quality. Quantitative status is an expression of the degree to which the groundwater body is affected by direct and indirect abstraction, suggesting the chalk is potentially over-abstracted in this area.

3.7.3 Implications for wetland habitat creation

The tidal flat deposits are dominated by clay and silt. These deposits are likely to act as a low permeability aquitard which will limit the rate of infiltration to the ground and yield limited groundwater. Also, given their low permeability, it is very likely that they will hold surface water when it accumulates in topographic depressions across the site.

Any earthworks associated with the future habitat creation on site will be very shallow (limited to the upper metre of the ground profile). The field drains on site may change the nature of the upper layer of deposits so would have to be blocked as part of any scheme. Given the significant thickness of drift deposits on site there is very unlikely to be any change in groundwater interaction with the underlying Chalk Principal Aquifer.

3.7.4 Catchment Abstraction Management Strategy (CAMS)

The site lies within the Grimsby, Ancholme and Louth Catchment Abstraction Management Strategy (CAMS) area, as defined by the EA. The CAMS document produced by the EA

describes where water is available for abstraction and the implications water resource availability has for new and existing water abstraction licences.

The CAMS for the site suggests that groundwater resources in the Chalk are fully committed to existing users and the environment. Consequently no new consumptive groundwater licences will be granted. New non-consumptive licenses will be considered on a case-by-case basis.

The CAMS states the following for surface water abstractions:

- No new unconstrained licences will be granted at any flows;
- New licences for consumptive water abstraction will be considered at extremely high flows (occurring less than 7% and 10% of the time), subject to hands off flow (HOF) conditions;
- Water may be available at lower flows subject to HOF conditions, if you can buy (known as licence trading) the amount equivalent to that recently abstracted from an existing licence holder;
- Any new abstraction licences with the potential to affect the downstream Humber Estuary SPA/SAC will be assessed under the Habitats Regulations;
- Applications for non-consumptive purposes will be considered on a case-by-case basis.

If a surface water abstraction licence was applied for the scheme the following factors would aid in the EA's consideration of the application:

- The scheme would be for conservation purposes,
- The abstractions would be limited for February to May (no abstractions during the Summer) (see Appendix D),
- The surface water drainage design for ALP will change the outfall location of the catchment, so that it will not contribute to Skitter Beck (see Section 5.2.3).

The last factor especially, means that a surface water abstraction, in itself, should have minimal impact on the flows of Skitter Beck.

3.8 Hydrological and Hydrogeological Conceptual Model

The EA defines a conceptual model as "*a description of how a hydrogeological system is believed to behave*" and its development as "*an iterative process of development and testing in which new observations are used to evaluate and improve the model*" (Environment Agency, 2002, p.4. 1-2).

A conceptual model summarises the understanding of the functioning of a groundwater system. The main features of the conceptual model for Halton Marshes are as follows:

- The site lies within a flat coastal plain running parallel to the Humber which is protected by a sea defence wall.
- The site lies within the catchment of Skitter Beck which discharges to the Humber beyond the northern boundary of the site. The main hydrological control is the main drain which runs parallel to the western boundary of the site.
- The site is underlain by drift deposits comprising low permeability clay dominated tidal flat deposits. Palaeo-channel tidal creek features are also apparent which create hollows across the site.
    - The bulk permeability of the upper layer has been increased by field drains
- Till deposits outcrop on higher ground to the west forming a watershed approximately 2km from the coastline, and these deposits are regarded to comprise a secondary (undifferentiated) aquifer by the EA.
- The bedrock approximately 13m beneath the site belongs to the Cretaceous Burnham Chalk Formation but are isolated from the site by the low permeability tidal flat deposits.

4 Design Principals

This chapter describes the general principles for wet grassland creation, and goes on to develop these principles specifically in relation to the site.

Wet grassland design consist of two main elements:

- Hydrological controls,
- Vegetation management controls.

This chapter focuses on the hydrological controls. Vegetation management is described in Section 6.2.

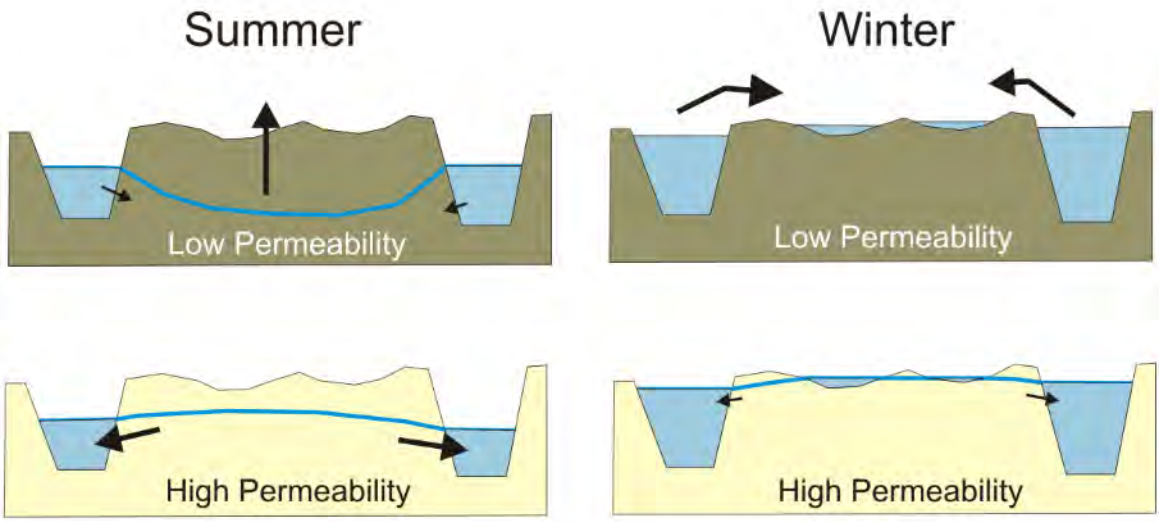
4.1 Hydrogeological Controls

There are two main hydrological types of wet grassland: those developed on high permeability soils which are dependent on maintaining high groundwater levels, and those on low permeability soils which are dependent on retaining surface water in topographical hollows (JBA Consulting 2013). Figure 4-1 gives an overview of how each of these mechanisms work. The wet grassland on high permeability ground model is dependent on high water levels in the surrounding drains or rivers to cause high groundwater levels to occur across the site.

In the low permeability model, water levels in the surrounding ditches are not as important as the low permeability nature of the soils isolates them from the groundwater levels within the fields between them. Instead the low permeability model is dependent on surface inundation for topographical hollows; either through flooding or through retaining rainfall.

Based upon our assessment of site geology and conditions we are of the opinion that the site lends itself to a low permeability type model for creation of the required habitats.

Figure 4-1 Typical mechanisms for creating wet grassland



4.2 Water Level Targets

4.2.1 Target Species

Curlew

Curlew require a medium-long sward height (15-30cm), with shorter tussock areas (5cm) scattered around the site. The water table needs to be near the surface but they require drier areas with tall sward for nesting. Following nesting the water levels should be allowed to drain down slowly (RSPB, 2005). In winter Curlew are typically found in and around estuaries on pastureland and on the shore (Holden & Cleeves, 2014).

Black-tailed Godwit

A very high water table is required without surface flooding during the previous winter (RSPB, 1997). Adults tend to feed in deep water. In winter this species prefers soft coasts/ estuaries and freshwater habitats (BirdLife International, 2016).

Lapwing

Lapwing feed on soils and sward invertebrates and earthworms (especially adults) which are especially abundant in unflooded grassland. Lapwing require a close cropped sward and this is usually achieved with either winter flooding (which restricts sward growth) or grazing with livestock (Ausden, 2001) (Benstead, et al., 1997, p. 72).

Ruff

Ruff prefer lowland wet meadows which are grazed in the summer and flooded in the winter (Holden & Cleeves, 2014). If breeding is to be achieved this species needs to lek in drier areas (RSPB, 1997) with short swards and nearby shallow water with muddy margins for foraging (English Nature, 1999). This species is most likely to be seen in the Winter as they typically overwinter on the coast (JNCC, n.d.).

Golden Plover

In the Winter they often move to lowland fields (Holden & Cleeves, 2014), usually in the company of Lapwings, where they feed on cranefly larvae which require damp areas for survival (BTO, n.d.). In the breeding season this bird prefers upland areas, such as blanket bog, heather moorlands and limestone grassland (Mullarney, et al., 1999) and should not be seen on site.

4.2.2 Additional Wader Species

Wet grasslands provide a valuable habitat for a range of species, particularly wading birds such as Snipe *Gallingo gallinago*, and Redshank *Tringa totanus*. However, both of these species have slightly different habitat preferences, particularly when it comes to breeding, as summarised below. Wet grasslands also provide valuable wintering and migratory feeding sites for wildfowl.

Snipe

Snipe has a relatively restricted diet, feeding mainly on earthworms (and other invertebrates) in soft, damp soil (Ausden, 2001) with its long bill. Flooding of the land severely reduces the numbers of earthworms and other invertebrates in the soil while letting the water table fall too dramatically leads to a loss of these species at the surface, and therefore a decline in their availability for this species.

Redshank

These require very similar conditions to Lapwing.

Bats and Passerines

There are no specific targets for these species, however, bats will benefit from ponds and scrapes as foraging habitats. Passerines, such as Skylark and Meadow Pipit like dry areas to breed and forage in.

4.3 Scrape design on low permeability soils

On clay soils, wetland birds will use the wetted margins for feeding (rather than feeding across the surfaces of the field) and therefore scrapes can offer such margins though it is important for the scrapes to create and maintain long margins (Acreman, et al., 2010). Scrapes are not intended to be permanent bodies of deep water like ponds, and therefore they will not provide habitat for fish and other aquatic species which require significant water depth throughout the year.

JBA Consulting's (2013) study into low permeability soil wetland grassland schemes in Lincolnshire identified principles required for successful schemes. The study suggested that the best scrapes should retain the water they collect and be effective at concentrating surface water towards them. It is ideal to have a relatively large catchment to scrape size and to have the shortest distance possible between the edge of the catchment and the scrape (without

limiting the catchment area too much) and the steepest slope possible. This will allow the greatest possible amount of run-off to reach the scrape and limit the amount of infiltration of rainfall into the ground. Scrapes should have wide, shallow sides, so whatever the water levels within them there are still shallow muddy margins and extensive drawdown zones for the creation of suitable feeding habitat for wader birds.

A good scrape design for focussing run-off will have the following features (JBA 2013):

1. A relatively large catchment to scrape size.
2. The shortest distance possible between the edge of the catchment and the scrape (without limiting the catchment area too much) and the steepest slope possible. Together this will limit the infiltration of rainfall into the ground before it enters the scrape.
3. Once run-off enters the scrape, it should be allowed to flow to one low point so that when water levels are low, the catchment of the scrape does not splinter, feeding many smaller depressions.
4. The scrapes should have shallow sides so whatever the water level is within them, there are still shallow margins for feeding.
5. They will not have spoil laid down immediately next door to the scrapes in a way that reduces their receiving catchment area.
6. The scrapes should be located some distance from any areas of trees and scrub to reduce the risk of predation from potential predator perches and areas of cover.
7. The scrapes should hold water to until at least mid-summer (though potentially even later for some bird species such as Black-tailed Godwit) to allow for successful wader breeding.

4.3.1 External inputs of water

The section above discusses the optimal scrape design for capturing and retaining surface water run-off. Even if the best method for scrape design is adopted it is not guaranteed that scrapes will be able to retain water to mid-summer or later. The water budget of some sites is such that the outputs (evaporation and other losses) outweigh the inputs (rainfall) leading to a negative water balance (JBA 2013). If a negative water balance persists for a substantial length of time, water from the system may be lost more rapidly than desired. On sites which have a water balance which will not allow even well designed scrapes to persist into the summer months (or early autumn in the case of Godwits) the only remaining option is to secure an additional supply of water supply and input this to the site, effectively topping up the scrapes when necessary. Methods which could be employed to input an external supply of water to a site could include pumping water onto a site from a nearby water body such as a drain, ditch or pond, or drilling a water supply borehole to input groundwater to the site.

4.3.2 Winter Water Level Management

The target birds have different winter water level requirements. The design of the scrapes (or other open water bodies) have to vary across the site to create areas where:

- the scrapes are maintained and could spill out onto the surrounding ground,
- the scrapes are allowed to completely drain down,
- the scrapes are maintained but do not flood the surrounding ground.

Overall, the objective is to create a mosaic wet area, isolated open pools and dry areas. The low permeability nature of the underlying soils, allows these areas to be relatively easily compartmentalised. Implementation of a flexible management regime over the winter months will maintain the conditions required by each of the species across the site.

Certain areas will be managed for Black-tailed Godwits, here winter flooding will be avoided by allowing water to drain. Elsewhere, water will be encouraged to pool on site in scrapes, ponds and furrows to benefit Curlew, Ruff and Lapwing. Dry areas, will also be maintained for Golden Plover. Overall though the site will have appearance of an open wet grassland and, in all likelihood, the bird species will range across the site, taking advantage of seasonal changes in the water levels.

5 Site Constraints

A number of potential constraints to undertaking habitat creation works across Halton Marshes have been identified. Some of these constraints directly relate to the target species desired on site, and others relate to more general site constraints.

5.1 Target species constraints

Constraints relating to the target species include:

- Habitat area requirements:
  - 20 ha Curlew
  - 12 ha Golden Plover, Lapwing, Curlew and Ruff
  - 20 ha Black-tailed Godwit
- Buffer zones (from site boundaries)
  - 150m west boundary
  - 50m all other boundaries
- 1.7ha neutral grassland within the buffer
- Hedgerow removal
- Wet ditch to keep dogs out
- Target species periods - as highlighted in Table 2-2.

More general site constraints include:

- Site topography
- Water quality
- Development plans within the site catchment (including water quality)
- Functionality of the sea wall
- Third parties (nearby house)
- Landfill
- Source of additional top up water

5.2 General site constraints

5.2.1 Site topography

The site itself is generally fairly flat, meaning any proposals to have water flowing across the site must be carefully considered in order to function.

Higher ground lies to the west of the habitat creation area, and the runoff from this area could potentially be exploited for the habitat creation. However, there is a relic palaeo-channel on-site which runs broadly parallel to the western boundary of the site forming a depression. The presence of a hollow lying directly between the potential up-catchment source of water and the main body of the site means getting water onto the site itself is difficult as the gradients are not naturally conducive. Similarly, there is a need for water to be able to flow across the site itself.

There is one branch of the remnant palaeo-channel which cuts through the site running broadly southwest - northeast. The means that the topographical gradients are also not conductive to allow the flow of water from the southern half of the site to the northern half and therefore design measures will be necessary to allow for movement of water across the site.

5.2.2 Water quality

Should the quality of water on site be poor, there may be negative implications for habitat creation on-site and potentially even a threat to human health. In order to assess any constraints to the project which may be caused by water quality issues five water samples were collected from Halton Marshes on 1st March 2016, and dispatched to a UKAS accredited

laboratory for chemical analysis for a range of general water quality indicators. The results are presented in Appendix C and show the following:

- Salinity is currently higher in bodies of standing water (whether Winters Pond or small ephemeral pools within the palaeo-channel). However, levels of salinity are still relatively low (just brackish) and is likely to be the result of sea spray aerosol deposition. It should be noted that until recently the site was productive farmland.
- In general the water quality is better in the main drain than the standing bodies of water. There are two exceptions to this:
    - Calcium levels - suggesting influence of the chalk and chalk parent material of the till within the catchment.
    - Suspended solids in the main drain sample downstream of the road. This appears to be the result of run-off on the day of sampling from the road which was dirty as a result of recent agricultural activity.

Overall, testing showed that the main drain would be a suitable source of water as it is of a better quality than the open water bodies, and particularly the palaeo-channel ephemeral open water body on site.

5.2.3 Development plans within the site catchment

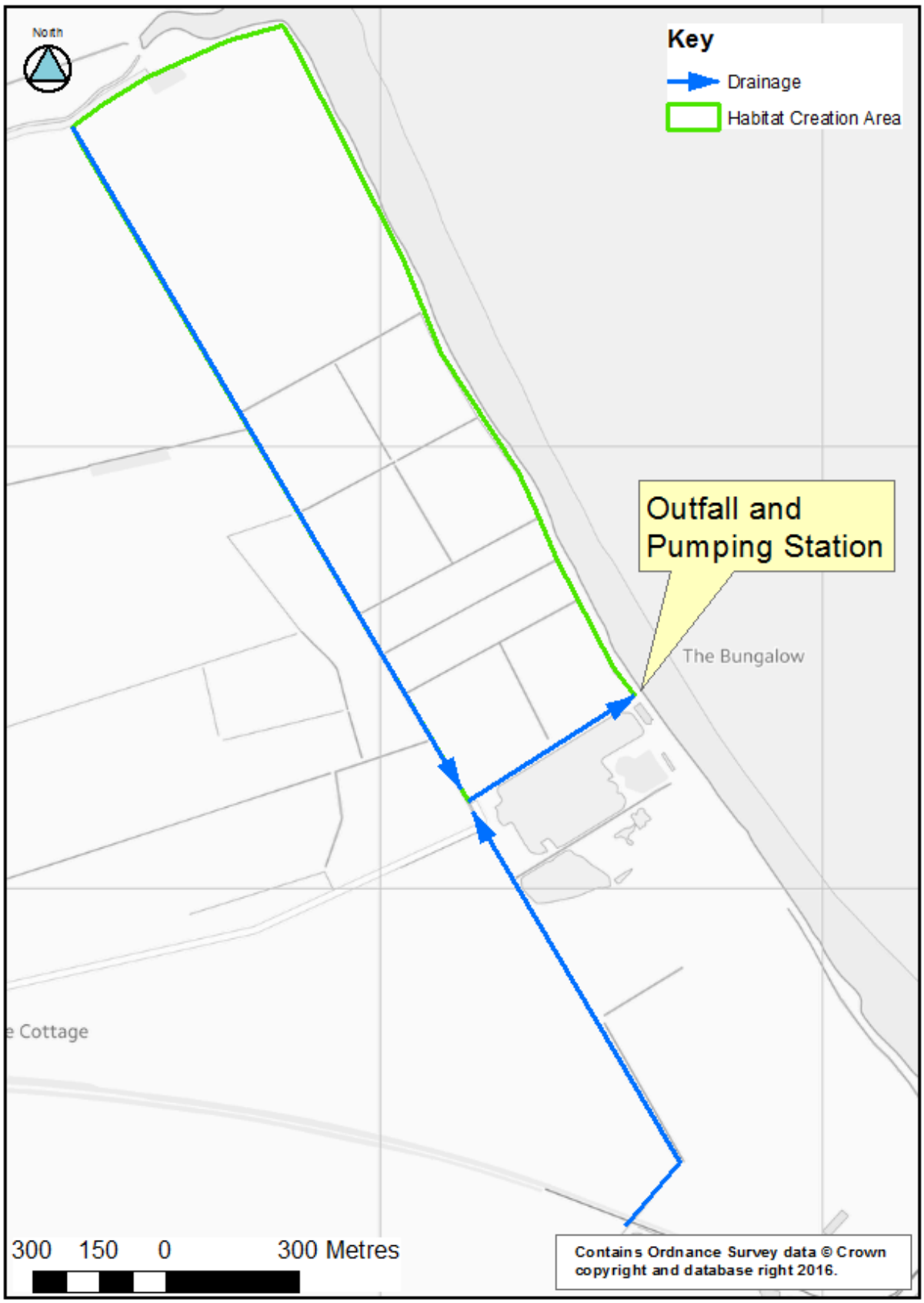
In order to develop a wet grassland habitat on site, it may be necessary to ensure water from the site catchment is encouraged to flow onto Halton Marshes. It is understood that the current plan is to develop a commercial park adjacent to the site within the site catchment. Developing a business park will change the primary land use within the site catchment from predominantly agricultural farmland to a mainly urban environment, and this will significantly alter the hydrology of this adjacent area land.

The current development and drainage plan (Hannah Reed and Associates, 2007) will have three main hydrological impacts upon the overall catchment (see Figure 5-1):

- A flood attenuation basin in the upper catchment will reduce the flashiness of inputs to the main drain.
- The increase in hardstanding may increase the peak run-off rate in the lower catchment.
- The direction of flow and outfall location of the site will be modified so that the main drain will discharge via a widened drain along the southern boundary of the site, via a pumping station/ flap valve outfall (tidal dependent) located in the south-eastern corner of the site.

Any scheme has to be flexible to cope with these changes as and when they occur.

Figure 5-1: Development Modification of the Hydrology



5.2.4 Functionality of the sea wall

The wet grassland habitat design is reliant upon the sea wall remaining functional. Should the wall fail and not be repaired, this will have a significant impact on the wet grassland area.

5.2.5 Third parties

Creating a wet grassland habitat across Halton Marshes will involve creating areas of standing water on site. The development must not lead to negative impacts for third parties, including impacts on the drainage of third party properties.

5.2.6 Landfill

There are a number of landfill sites located to the south of the site, and it is essential that the habitat creation works do not have any impact on the hydrology of these sites. The development of a wet grassland at Halton Marshes is likely to require an external source of water and the most appropriate solution is to draw water from the main drain alongside when it is required. If water levels are artificially raised in this drain in order to secure a water supply it will be necessary to ensure that standing water levels are not raised adjacent to any landfill sites.

5.2.7 Source of additional top-up water

A water balance has been undertaken for the site (Appendix D). It suggests that the site is relatively "robust" in terms of its ability to retain water. However, although scrapes are likely persist in most years through the required target periods, a source of top up water would be desirable. The main drain during the months of February to May could provide water but the flows in the summer months are likely to be too dry to be a reliable source of water. Water quality analysis indicates that the drain can be used as a source of additional "top-up" water.

6 Design Options

6.1 Introduction

This chapter outlines a number of possible habitat creation opportunities for Halton Marshes. It has the following elements:

- The principles of the Habitat Management Plan,
- An appraisal of potential wet grassland creation options,
- A detailed description of the preferred scheme.

6.2 Habitat Management Plan

6.2.1 Grazing Regime

The best form of habitat management to achieve the requirements of the desired wader species at Halton Marshes is grazing with cattle. Cattle are generalist grazers that leave a residual sward height typically in the range of about 4cm (Wilson, et al., 2004). However, they also defecate and avoid their own excretions, leaving tussocky patches of ungrazed habitat within the overall grazed grassland matrix. Unlike sheep, goats or horses, they are far less choosy when consuming vegetation and graze all areas equally and relatively lightly in comparison with the more concentrated grazing in favoured areas of the species mentioned above. Cattle do, however, have a propensity to trample nests in the Spring (Hart, et al., 2002) and poach ground during the winter months, when the water levels are high. It is, therefore, important to restrict the number of animals per hectare in the bird breeding season, whilst ensuring that the grazing effort is maximised during the late summer and Autumn to ensure that the sward is grazed short before the Winter months, removing material before it senesces.

Winter grazing with sheep can be effective in tandem with cattle as it reduces parasite loadings and can keep the sward short during the winter months, especially in mild years with long growing seasons. However, the issue with the site at Halton Marshes is its location in relation to the general availability of livestock as it is in a predominantly arable area, nevertheless it should be possible to rent the land for sheep grazing over the winter months to upland farms.

Overall the best solution for keeping the grasslands short would be to winter sheep on the land between October and March, introducing cattle after a period of relaxation in the second week of May, initially at low densities of around 0.5LU/ha (Bientema & Muskens, 1987) but, in late June this can be upped to a rate of 2.0LU/ha until mid October. If necessary, after July, this can be upped further in order to achieve the correct sward height prior to the onset of winter and wetter conditions. This will reduce the sward to a height where it can be grazed by sheep over the winter months, however, if large flocks of Wigeon *Anas penelope* or geese frequent the site, these can serve the same purpose removing the need for winter sheep grazing. Winter grazing needs to take account of the fact that much of the site, not included within the core area for Black-tailed Godwits, will be surface flooded, therefore, a stocking rate of one ewe per hectare (0.15LU/ha) should be utilised.

In order to create the sward types necessary to suit the individual wader species, it may be necessary to sow (or plug plant) species such as Cocksfoot *Dactylis glomerata*, Soft Rush *Juncus effusus* or Hard Rush *Juncus inflexus.* There may also be a need to electric fence of parts of the site to create small areas of more tussocky grassland. These small areas of habitat will serve as nurseries and nesting sites for the waders on site and increase the overall value of the habitat to wading birds.

6.2.2 Hedgerow removal

All the hedgerows within the main site will need to be removed as part of this scheme. However, in compensation and to aid screening, new lengths of hedgerow will be planted alongside the wet ditch on the east side of the site, enhancing the existing intermittent hedgerow on this location. The existing screens to the north and south will be enhanced by gapping-up to ensure that the birds using the site will remain undisturbed by people and/or predators.

6.2.3 Screening

Screening will be planted on the landward side of a wet ditch below the floodbank on the eastern boundary of the site. No hedgerow trees will be planted into this hedge.

6.2.4 Reseeding

It is not proposed to reseed the site generally, as the sward that has developed is suitable for wading birds if correctly managed. However, at the moment the sward is rank and overgrown with tall herb species and this will have had a negative effect on wading bird populations since arable production ceased on site. However, the loss of this area will have a negative effect on passerine populations, which were good at the time of the site visit, with large numbers of Goldfinches *Carduelis carduelis* present on the site. In view of this and the requirements for some tussocky grassland on site, it is advisable to leave a wide uncultivated strip around the outside of parts of the site, which could be electric-fenced to exclude sheep in the winter months. The northernmost field would also benefit from a small area of ploughed land being left fallow during the winter to encourage Golden Plover and Lapwing to use this field, prior to sowing with a wild bird mix in the Spring prior to nesting. This could be rotated along the eastern edge of the core site, leaving topped vegetation in the winter for wintering finches whilst reducing the potential for predator perches. These areas could be electric-fenced along with the rough grass margins making management easier, if sheep grazing in the winter is necessary.

The only portion of the site that should be reseeded is a 1.7ha area at the most northern part of the site. This could be sown with a species-rich MG5 grassland mix to create an area of neutral grassland. Given the highly productive nature of the land, it is highly likely that this will become rank if not regularly mowed and this would be undesirable from a habitat management point of view. Therefore, a hay cut should be taken from this each year in August and the grassland left rough over the winter months. Given the nature of the sward mix, this hay could easily be sold to local equine interests.

6.3 Options for Wet Grassland Creation

6.3.1 Overview

A series of outline design options have been developed for the site as presented in Table 6.1 and are based on JBA's previous experience of development of wetland habitat across a range of sites. This section aims to give an overview of the options reviewed.

The following sections provide additional detail on the nature of these schemes, an options appraisal taking into account the mitigation requirements balanced against the general site constraints and concluding with a preferred option.

Table 6-1: Options Overview

Option Name	Description
Shallow Weir	Installing two weirs within the main drain causing shallow inundation of the palaeo-channel. This is coupled with additional scrapes.
Deep weir	Installing two weirs within the main drain causing deeper inundation of the palaeo-channel. This is coupled with some additional scrapes.
Field Scrapes	This consists of a series of linear isolated scrapes.
Tiered Scrapes	This consists of a series of scrapes which are connected to allow the distribution of water across the site. The scrapes are tiered through the installation of "saddles" between the scrapes, which control water levels and ensure that the scrapes at the top of the system are not drained. No external "top-up" system (pump or catchwater) would be initially installed (but could be if the need arose).
Tiered Scrapes with a Catchwater	As the tiered scrape option with the addition of a "passive" catchwater which would collect run-off from the hillside to the west. There is a low area between the site and the hills to the west formed by the palaeo-channel. In order for the water from the catchwater to be feed into the site

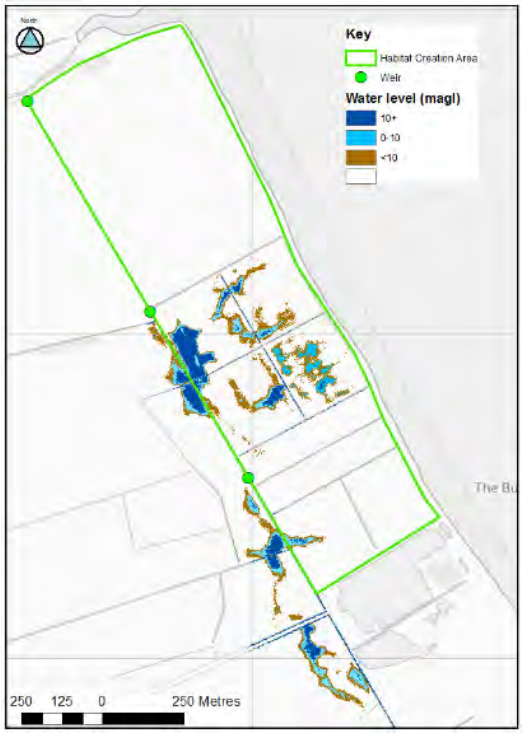
	via gravity, a culvert over the main drain and palaeo-channel low would be required.
Tiered Scrapes with a Pump to draw water from main drain.	As the tiered scrape option the addition of a pump from the main drain supplying the system.

Figure 6-1 provides general overview plans of the considered options and presents key features of the outline designs together with an indication of wetted areas through the use of site LIDAR data. No separate plan has been provide for the Field Scrape option as this consists of a series of uniformly spaced linear scrapes, nor the Tiered Scrape option as this appears very similar to the Tiered Scrape with a Pump option.

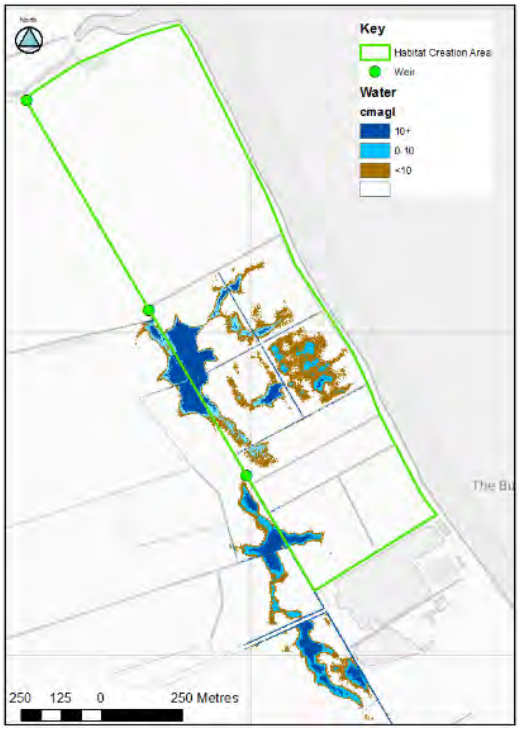
Figure 6-1: Options

Options

Shallow Weirs

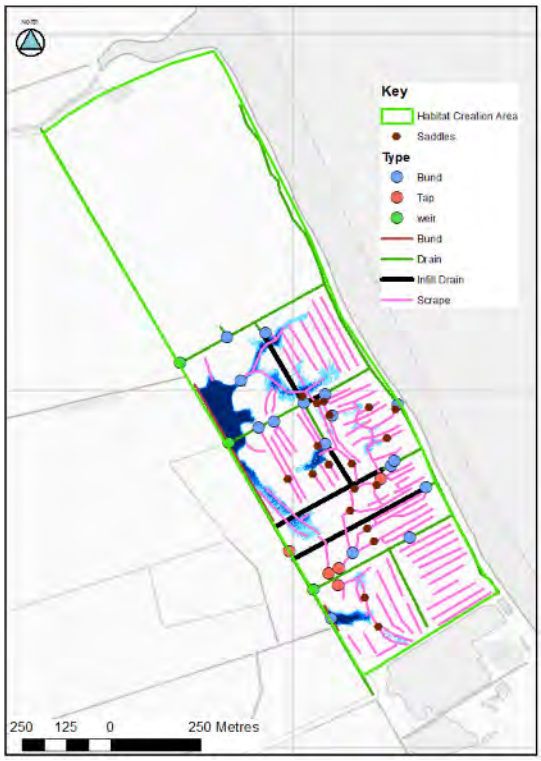


Deep Weirs



Tiered Weirs with a Catchwater

Tiered Weirs with a Pump



6.3.2 Scrape Design

The design of the scrapes for the site are based on the principles outlined in Section 4.3 and reflect the finding of the water budget (see Section 6.3.3 and Appendix D). In order to persist

through to September in all but the driest years, the scrapes have been designed to be relatively deep (circa 0.75m to 0.85m) (Note - if a scrape is able to persist through September, it should be able to continue to persist through autumn). As a result they will also be relatively wide (circa 4.5m) so that the slopes of the scrapes are not overly steep. This ensures good marginal habitat (see Figure 6-2). Examples of scrapes with similar parameters recently installed at a nature reserve near Doncaster are shown in Figure 6-4 and Figure 6-5.

Within all of the tiered scrape options, the scrapes would be connected together to allow the distribution of water. To ensure that the water does not all flow and pool at the lowest point in the system; the scrapes will be separated by a shallow saddles set just below the ground surface (see Figure 6-3 and Figure 6-5). The tiered scrape option also allows for parts of the scrape system to the drained down during the winter, to limit winter flooding. The management of scrapes through winter is described in more detail in Section 6.4.6.

Figure 6-2: Typical Cross Section of a Scrape

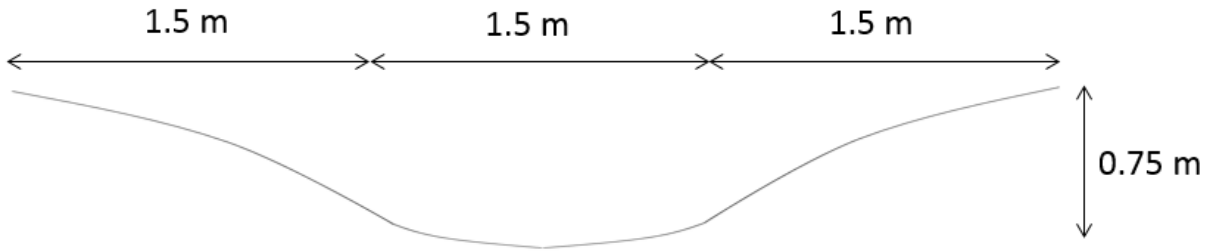


Figure 6-3: Long Section of a Tiered Scrape System (NTS)

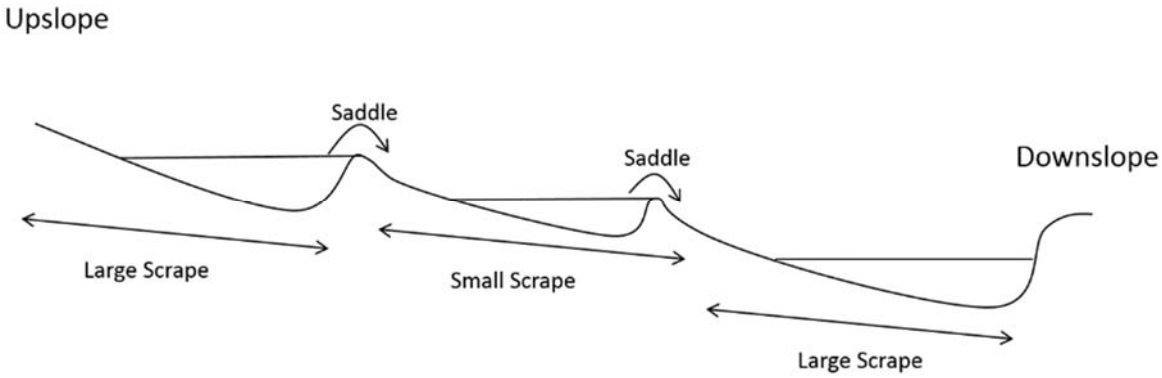


Figure 6-4: Linear scrapes at habitat creation site near Doncaster immediately after excavation

Figure 6-5: Linear scrapes at same site with saddles one month after installation

6.3.3 Water budget

A series of water budgets have been developed in order to assess the ability/ likelihood of the different options in meeting the required water level targets, and this work is presented in Appendix D. The water budgets are based on the use of Met Office Rainfall and Evapo-transpiration Calculation System (MORECS) monthly data from 1986-2015 collected for MORECS square 101 (in which the site is located) for a range of land uses which are relevant to the site in its current form and as a mitigation area.

In summary they comprise the following:

- A basic water budget - this calculates direct rainfall minus evaporation losses to estimate the drawdown in scrapes (i.e. progressive reduction in water levels) during the target periods.
- A volumetric water budget - this is a monthly mass balance water budget calculating the inputs (rainfall and run-off) and outputs (evaporation, transpiration and run-off) for the whole of the site and also additional areas such a catchwater to the west which could contribute to the site.
- A combined water budget - this integrates the volumetric water budgets ability to estimate the degree to which the scrapes would be full at the beginning of the target periods with the basic water budgets estimation of drawdown in water levels in the scrapes during the target period to estimate the depth of water at the end of the target period.

The water budget was conducted on data gathered from 1986-2015 (30 years), the results can therefore give an estimation of the proportion of years a scheme may not be successful. The result however are not true return period, but give a broad indication of how successful the assess schemes could be.

Based on the water balance assessments the following conclusions can be drawn:

- A Shallow Weir option as outlined above would not achieve the required targets as the inundation deep created (circa 200mm) would be too shallow to persist over the required periods (the water budget estimated it would have failed 27 times over the 30 year period). However, a Deep Weir option would produce water deep enough to persist (circa 600mm) in all but extremely dry years (the water budget estimated it would have succeeded in every year in the 30 year period).
- The maximum deficit (the difference between the depth of rainfall and losses due to evaporation) for the scrapes, calculated in the last 30 years, in the target period was circa 500mm (the average deficit was circa 300mm). Therefore, provided that the 750mm - 850mm scrapes are full at the beginning of the target period (beginning of February) they should persist throughout the required timescales annually.
- Without a way of providing "top up" (either a catchwater or pump) the scrapes would be more prone to not fully filling up in late winter/early spring as they would only be supplied with run-off from the land immediately adjacent or direct rainfall. Provision of a top up supply would mean that they would only fail in the most extreme circumstances (only 1 year in the past 30 years was calculated to fail, if a pump was utilised)..
- In the majority of years there is likely to be sufficient water available in the main drain for pumping into the site from February to May to completely fill the scrape system (in only 2 years in the 30 year period was it calculated that there would not be sufficient flows to allow this). However, flow in later months from May onwards could not be relied on to fill up the scrapes. Therefore, topping up of the scrapes would need to occur by May at the latest.

6.3.4 Options appraisal

An appraisal has been undertaken for the various options outlined in Table 6-1, which as previously stated are based on practical measures based upon JBAs experience on similar sites. The results are summarised in Table 6-2 based on three key criteria:

- Ability to fulfil targets - i.e. does the water budget indicate that the water level targets would be met by the scheme.
- Impact on external receptors - i.e. would the scheme create significant impacts such as drainage issues to third parties.
- Construction, maintenance and robustness - i.e. can the scheme be delivered in a relatively straightforward way, can it be maintained and will it remain successful in delivery of the habitat requirements?

The appraisal indicates that the Tiered Scrapes with a Pump option would offer the best overall outcomes in terms of all three criteria. This option is discussed in further detail in Section 6.4

Table 6-2 Options Appraisal

Option	Ability to Fulfil Targets	Impact on External Receptors	Construction and maintenance Issues	Conclusion
Shallow Weirs	Collects water from the wider catchment, however the ability to fulfil targets is limited as the areas of inundation would be too shallow to persist. Estimate – Only successful in 3 of 30 years based on water balance assessment.	The water level in main drain would be raised above bank level. Significant impact on the drainage of the whole coastal plain upstream of the weir including: -Third party house -Access road -Landfill drainage	Relatively simple to construct and maintain. Weirs will require active management and maintenance.	Would not be successful and have significant impacts on external receptors.
Deep Weirs	Collects water from the wider catchment, ensuring the system is likely to fill and the areas of inundation would be sufficiently deep to persist. Estimate – All 30 years of record would have been successful.	The water level in main drain would be raised above bank level. Significant impact on the drainage of the whole coastal plain upstream of the weir including: - Third party house - Access road - Landfill drainage	Relatively simple to construct and maintain Weirs will require active management and maintenance.	Like to be successful but have significant impacts on external receptors.
Field Scrapes (isolated system of scrapes)	Cannot collect water from the wider catchment. Topping up by a pump would be difficult as the scrapes are isolated. However it would be successful in a high/moderate proportion of years Estimate – failure in 1 year – near	Limited as external drains will not be modified.	Very simple to construct with limited maintenance.	Could be successful, however the difficulties in the ability to top-up the system with water would limit the robustness of this solution in drier

Option	Ability to Fulfil Targets	Impact on External Receptors	Construction and maintenance Issues	Conclusion
	failure in a further 5 in the 30 year record			years.
Tiered Scrapes	Cannot collect water from the wider catchment but a pump into the main drain could be easily retrofitted. It would be successful in a moderate proportion of years Estimate – failure in 2 year – near failure in a further 6 in the 30 year record	Limited as external drains will not be modified.	Construction would require that the fall along the scrapes works in terms of the ability to distribute water and retain water in the upper scrapes.	Could be successful, however without a pump being installed initially there is a chance that the scheme would fail periodically.
Tiered Scrapes with Catchwater	Would be successful in a very high proportion of years. Estimate – failure in 1 year in the 30 year record.	Limited as external drains will not be modified.	Nature of the catchment will change as the site to the west is developed, which may affect the ability of the catchwater to provide water (however, if all drainage from site to west is diverted to planned pumping station as part of future development plans it may be possible to draw off a proportion of the drainage to provide top up water provided it was of suitable quality). Construction would require that the fall along the scrapes works in terms of the ability to distribute water and retain water in the upper scrapes.	Likely to be successful but difficult to incorporate into the overall scheme as timescales for future development of site to the west are currently not known with any degree of certainty.
Tiered Scrapes with Pump	Would be successful in a very high proportion of years. Estimate – failure in 1 year in the 30 year record.	Limited as external drains will not be modified.	Construction would require that the fall along the scrapes works in terms of the ability to distribute water and retain water in the upper scrapes.	Preferred Option Likely to be most successful. However, may have

Option	Ability to Fulfil Targets	Impact on External Receptors	Construction and maintenance Issues	Conclusion
			The direction of the main drain will be modified by the development, therefore the layout of the distribution scrapes would need modifying to allow the planned pump at the planned outfall to be incorporated into the scheme.	to be modified slightly depending upon future development of land to the west.

6.4 Key Elements of Preferred Option

The result of the options appraisal indicates that a Tiered Scrape Option with a Pump which provides a supply of scrape top up water from the main drain would be the preferred option for the following key factors:

- The inclusion of a pump connected to an interconnected water distribution and scrape system will improve the success of the scheme through relatively dry years. The exact nature of the pump would be confirmed at the detailed design stage, but could be mobile and brought onto site during the critical pumping periods.
- The impact on the surrounding catchment should be relatively limited and should not create drainage issues for third parties, the landfill and the future development.
- The scheme is relatively flexible and can be adapted to take account of any changes in site drainage planned for the development site to the west.

This section provides further detail on how this scheme will function. The key elements of the scheme are presented on Map 2 (included an annotated version).

6.4.1 Pump

The pump from the main drain is located at the top of the scrape distribution system. The pump array has the following features:

- A sump will be created to storage a limited amount of water in the main drain to increase the efficiency of the pump. This will be coupled with a weir set in the main drain to slightly back up and create a depth of water. The parameters for the pump sump and weirs will need to be set to accommodate 1/2 a day of average flows with the main drain (circa 650m^3).
- The pump will be able to discharge into two scrape systems, one which flows northwards and the other southwards.
- Various options could be available for pumping. In its simplest form a mobile pump could be brought onto site as required.

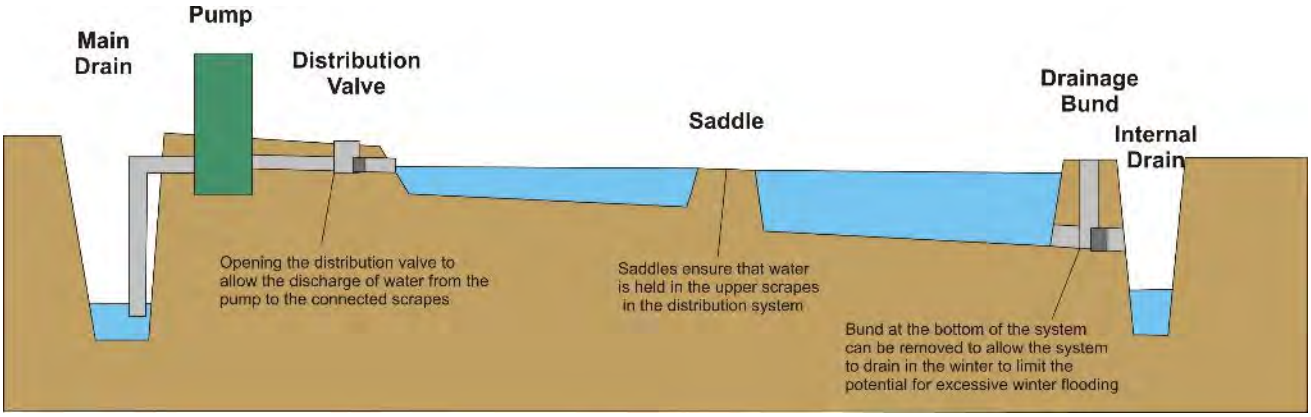
6.4.2 Scrapes and Distribution

A simplified schematic scrape distribution system is shown in Figure 6-6. It has the following features:

- A pump which pumps water from the main drain to the top of the distribution system;
- A series of distribution valves at the head of an interconnected system of scrapes which can be manually opened to direct pumped flow into different groups of scrapes
- A series of tiered scrapes separated by saddles (higher ridges in the base of the scrape). The pumped water will be able to flow down the scrape system and the saddles will ensure that water is distributed evenly along the system (i.e. highest scrape fills up initially until water level exceeds saddle crest and water then discharges to next scrape).
- Water can be released from the scrapes at the bottom (lowest elevation end) of the scrape system, through a structure containing a removable bund.
- It should also be noted that the outline design incorporates a series of isolated scrapes which would not be connected to the pumping system.

The elements a described in more detail below.

Figure 6-6: Pump and Tiered Scrape Schematic



The scrape system will effectively form the distribution channel from the pump. At junctions in the system, simple distribution gates can be set. This is likely to take the form of a short culverted section, with a manhole cover access to a stopper type valve (see Figure 6-7 as an example used on a similar type of wetland scheme to that proposed here) to control the distribution of water between individual scrapes.

The benefits of this type of approach is that it allows for significant flexibility in controlling the distribution of water on an "as required" basis, is relatively straightforward to install and operate.

Figure 6-7: Example of a water distribution gateway to control the flow of water between individual scrapes.

As described in Section 6.3.2, the scrapes will be separated with saddles to ensure that water will not just flow down the system to the lowest tier, but will be retained in the higher scrapes before cascading into the lower scrapes. The height of the saddles will need to be set to be as high as possible without the water spilling out of the scrapes and escaping from the scrape system (e.g. spill into an external drain). In most cases this is circa 10cm below ground level. The heights of the saddles are indicated in mAOD on Map 2.

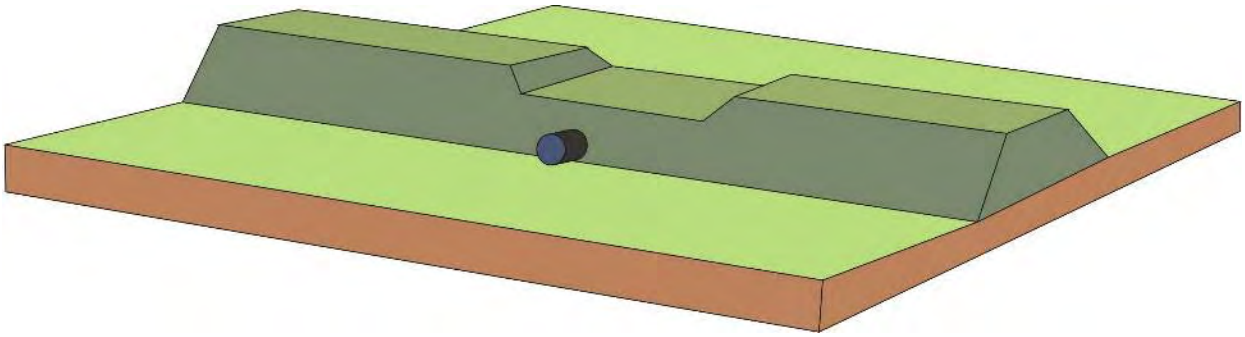
The exact design of the saddles would be subject to detailed design but are likely to take the form of an earth core protected from poaching by a grid paving system or concrete canvas would be sufficient. These can be monitored during the early years of the system operation and easily modified and maintained as the need arises.

It should be noted that because of topographical constraints at the site, a group of scrapes in the south-east of the site would not be initially connected to the distribution channel. However, they could be connected when the scheme is modified as the development is constructed (see Section 6.4.7).

6.4.3 Palaeo-channel

The site has a series of topographical lows formed by tidal creek palaeo-channels. The design can incorporate these features by blocking the channels with simple earth bunds, to impound water behind them. At their simplest, this will be a bund, with a reinforced overspill point and a large plugged culvert set in the base, to allow the system to be drained (see Figure 6-8). For the larger bunds, a formal weir structure would be incorporated into the bund.

Figure 6-8: Spillway within Bund and drainage culvert



6.4.4 Field Drain System

A number of Field Drains discharge into the main drain from the site. These will need to be addressed in order to prevent potential drainage of water from the newly constructed scrape system. . This is typically done in either a targeted fashion at known discharge points, or construction of inspection trenches along field boundaries.

Where field drains are identified when excavating the scrapes, these are typically dug out (including removal of surrounding course backfill materials such as gravels) to a distance of 2.5m from the edge of the scrapes and backfilled with clay arising from the scrapes. This aids in limiting the lateral flow of water out of the scrape to the surrounding ground.

6.4.5 Northern Field

Suggested works in the northern field (see Figure 6-9) should be limited to the blocking of the field drain system, including a small drain with a plugged culverted outfall to allow the draining of a depression in the winter and vegetation management (discussed in Section 6.2). This is due to the fact that this field already typically holds good number of Golden Plover during the winter months and therefore little modification is required.

Golden Plover prefer drier ground than other waders and this field is suitable for them now and, with the removal of the hedgerows, use should increase as the birds will feel less intimidated by the presence of potential predator perches and will have improved sight lines.

6.4.6 Water Level Management Plan

The following section presents the key elements of future water level management in order to achieve the requirements of the habitat creation.

6.4.6.1 Winter

Together the target birds on-site during winter have a range of different requirements. These are described in Table 2-2 but can be summarised as:

- Black-tail Godwits - no winter flooding
- Lapwing - some surface water
- Curlew - some surface water
- Ruff Winter - winter flooding
- Golden Plover - essentially dry

Section 4.3.2 outlines that a design should consist of a range of differing scrapes which can be managed in different ways to achieve the various requirements. The preferred design has

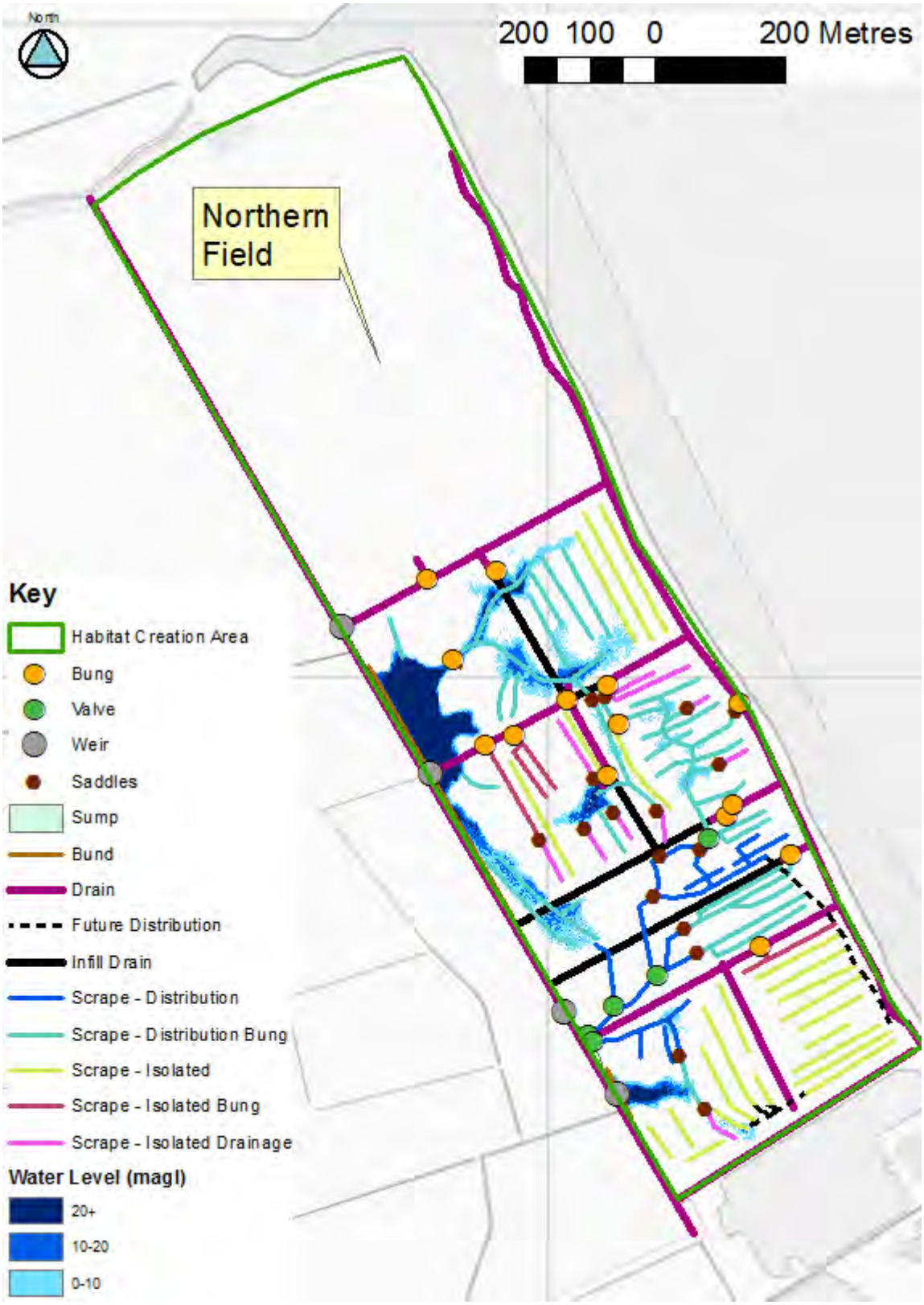
several classes of scrapes and open water bodies which can be managed in different ways (see Table 6-3, Figure 6-9, and Map 4) to achieve required outcomes.

The flexibility of having several scrape classes means that the requirements for core habitat areas for different species can be achieved across the site. This may also allow some rotation of the area of winter inundation.

Table 6-3: Scrape Classification, and other Area, and their Winter Management

Scrape Classification and other Areas	Description	Suitable Target Bird Habitat
Scrape - Distribution	These are scrapes in the upper tiers of the distribution system. In winter they cannot be fully drained down, however, once full water will cascade down into adjoining (lower lying) scrapes such that water should not spill out of banks and flood the surrounding ground.	Lapwing Curlew
Scrape - Distribution & Bung	These are the scrapes in the lowest tier of the distribution system. The removal of the bungs will allow water to fully drain from the scrapes.	If drained down - Black-tailed godwit and Golden Plover. If not drawn down - Ruff, Curlew and Lapwing.
Scrape - Isolated	These are isolated scrapes, not connected to the water distribution network and therefore once full will spill onto the surrounding land	Ruff
Scrape - Isolated & Bung	This are similar to the "Scrape - Distribution Bung" category but are not directly connected to the water distribution system. In the winter, their operation would be similar, i.e. they can be drained down of water where required.	If drained down - Black-tailed godwit and Golden Plover If not drawn down - Ruff, Curlew and Lapwing
Scrapes - Isolated Drainage	This are similar to "Scrape - Distribution" but they would not directly connect to the pump water distribution system. In the winter, their operation would be similar.	Lapwing
Inundated Palaeochannel	These are the topographical lows formed by palaeochannels which will be inundated and connected to the pump distribution system. In effect, they can be managed the same as the "Scrape - Distribution Bung" category as they have a release bung, or weir which will allow them to be fully drained down.	If drained down - Black-tailed godwit and Golden Plover. If not drawn down - Ruff, Curlew and Lapwing.
Northern Field	The management of this field is described in Section 6.4.6.	Golden Plover.

Figure 6-9: Scrape Classification in Preferred Design



Winter Water Level Management activities will involve the following key activities:

- Lowering of the weir controlling the internal drains to allow the system to freely drain.
- Unblocking of bungs at the lower end of the scrape systems where required to allow for drain down.

To avoid excessive water standing on the site during the winter, the system of scrapes presented in Map 2 has been designed to have a series of release bungs at the bottom of the system, which will allow the connected scrapes to act as drains and discharge water to the retained field boundary drains. While some bungs should not be removed to maintain enough standing water for wading species, such as Curlew and Lapwing enough should be removed to prevent the winter flooding of 20ha of pasture land for Black-tailed Godwits. The isolated scrapes will provide much of the surface water pools required for Ruff. The system can then be blocked again at the beginning of January to allow the system to fill up sufficiently before the target period starts in February.

To compliment the scrape system, weirs and bungs can be incorporated into the bunds across the palaeo-channel and can be managed in a similar way.

The plan also incorporates control structures on the drains so where possible, the water levels can be raised during the target period to allow free functioning during the winter. The drains may require some limited re-profiling to allow them to function in the envisaged way. However, for the drain on the eastern site boundary, this could be incorporated into the screening discussed in Section 6.2.3.

6.4.6.2 Spring to autumn

During this period there are two main functions:

- From spring to mid-summer the site will be managed for breeding waders (Note - not a target objective as laid out in Section 2.3)
- From late summer into early autumn there is a requirement for open water for Black-tailed Godwits.

It should be noted that the requirement for pools for Black-tailed Godwits extends beyond this period through late autumn and into March. However, the critical factor is to ensure that the scrape persist through the driest period of the year i.e. they can persist to the end of September. In October, within the 20ha targeted at Black-tailed Godwits, the bungs should be open and the scrapes here allowed to drain-down, preventing winter flooding.

The water level management during this period will consist of two main activities:

- Blocking the outfalls of the scrape systems with bungs,
- Pumping water from the main drain from February to May, if required, to fully fill the scrapes and palaeochannel in the distribution system.

6.4.7 Future Modification

Outlined in Section 5.2.3, are the planned modifications to the surface water drainage network as the site is developed. The tiered scrape system which is presented in Map 2 has been designed to incorporate flexibility in order that it can be readily modified in the future, if necessary, to incorporate a new surface water discharge location in the south-east corner of the site. When the modifications occur, the location of the pump can be altered to the new outlet. This will have two immediate benefits:

- The drain at this point will have a larger catchment (and therefore higher flows) compared to the previous pump location; and,
- There will be a small increase in the number of scrapes that will be fed into the distribution system.

6.4.8 Habitat Areas Required

These have been set out in Section 2.2 above and have been incorporated into the proposed scheme. If the scheme presented above is implemented then the planning requirements to allow development to proceed will have been met.

7 Conclusions

An outline wet grassland scheme has been presented to allow the creation of suitable habitats for a range of target species throughout the year. The scheme takes into account a water balance for the site which has been undertaken using MORECS data, an understanding of the current physical characteristics of the site and the surrounding area and the overall mitigation requirements as required by statutory authorities.

Due to the low permeability nature of the clay deposits on site, the scheme design has focused on the creation of a series of long linear scrapes, sufficiently deep to persist through the target period but shallowly sloped to allow the target bird species to utilise them.

To increase the robustness of the scheme, the design allows for topping up of water from the main drain through the use of a pump. Hydrological analysis suggests that there should be sufficient water to fill the system from February to May, however the flows in the main drain cannot be relied on in the summer months, and therefore it is important that pumping, if required, occurs during these months.

To ensure that the site does not experience excess flooding in the winter, a series of bungs and weirs can be adjusted to allow the site to effectively drain during this period.

The engineered elements of the scheme will need to be complimented by a series of vegetation management elements, including, hedge removal, screening, reseeding, and grazing management.

Appendices

A Maps

Map 1: Topography

Map 2: Preferred Option Design

Map 3: Preferred Option Design with Annotations

Map 4: Preferred Option Design with Scrape Classifications

North

LEGEND

LIDAR

mAOD

High : 8

Low : 7.4

JBA consulting

Map 1

Topography

140 70 0 140 Metres

North

LEGEND

Control Structures

- Bung
- Valve
- Weir
- Saddles
- Sump
- Bund
- Drain
- Future Distribution
- Infill Drain
- Scrape

Water Level (magl)

- 20+
- 10-20
- 0-10

LIDAR

mAOD

- <2.3
- 2.3 - 2.4
- 2.4 - 2.5
- 2.5 - 2.6
- 2.6 - 2.7
- 2.7 - 2.8
- 2.8+

2.33 **Height of Saddles in mAOD**

JBA consulting

Map 2

Preferred Design Option

2.28
2.33
2.33
2.33
2.33
2.33
2.26
2.21
2.34
2.33
2.46
2.36
2.41
2.45
2.55
2.55
2.57
2.68

100 50 0 100 Metres

North

Bung at bottom of the system to allow system to drain in winter

Weir that can be raised to allow internal and eastern boundary drains be raised to bankfull to create a wet ditch during sensitive periods

Bung at bottom of the system to allow system to drain in winter

Drains maintained to allow the site to drain in winter

Saddles set in scrapes to allow water to cascade down the system

Scrapes set in shallow sections of paleochannel to increase depth

Adjustable weir to allow paleao-channel to drain down in winter

Future modifications to the scrape system to allow the modified drainage system to be incorperate

Sections of drain infilled to allow water in scrapes to pass across

Valve to allow palaeo-channel to be directly filled

Weir set within the channel to aid in pumping

Location of Pump

Drain widened at this location to create sump for pump

Bung at bottom of the system to allow system to drain in winter

Boundary drain maintained to allow drainage of third party land

2.28 2.33 2.33 2.33 2.33 2.33 2.26 2.21 2.34 2.33 2.46 2.36 2.41 2.45 2.55 2.55 2.57 2.68

LEGEND

Control Structures

- Bung
- Valve
- Weir
- Saddles
- Sump
- Bund
- Drain
- Future Distribution
- Infill Drain
- Scrape

Water Level (magl)

- 20+
- 10-20
- 0-10

LIDAR mAOD

- <2.3
- 2.3 - 2.4
- 2.4 - 2.5
- 2.5 - 2.6
- 2.6 - 2.7
- 2.7 - 2.8
- 2.8+

2.33 **Height of Saddles in mAOD**

JBA consulting

Map 3

Preferred Design Option with Annotations

100 50 0 100 Metres

North

2.28
2.33
2.33
2.33
2.33
2.33
2.26
2.21
2.34
2.33
2.46
2.36
2.41
2.45
2.55
2.55
2.57
2.68

LEGEND

Control Structures

- Bung
- Valve
- Weir
- Saddles
- Sump
- Bund
- Drain
- Future Distribution
- Infill Drain
- Scrape - Distribution
- Scrape - Distribution Bung
- Scrape - Isolated
- Scrape - Isolated Bung
- Scrape - Isolated Drainage

Water Level (magl)

- 20+
- 10-20
- 0-10

2.33 **Height of Saddles in mAOD**

JBA consulting

Map 4

Preferred Design Option
with Classified Scrapes

100 50 0 100 Metres

B Auger Hole Logs

1 Halton Marshes Auger Hole Logs

1.1 Auger Holes excavated on 24th February 2016, logged by Alice Davis and Alex Jones

HMA1 **NGR 515197 421233**	
Depth (mbgl)	Description
0 - 0.3	Light brown and grey mottled CLAY
0.3 - 0.5	Orange (50%) and grey (50%) mottled CLAY
0.50 - 0.75	Orange (25%) and grey (75%) mottled CLAY
0.75 - 1.00	Orange (40%) and grey (60%) mottled CLAY with rare fragments of black organic material
1.00 - 1.10	Orange (40%) and grey 60%) mottled CLAY with occasional pockets of light brown silt
1.10 - 1.50	Orange (50%) and grey (50%) slightly silty CLAY with occasional fragments of black organic material
1.50 - 1.60	As above with chalk clasts
End at 1.60 m	

HMA2 **515154 421348**	
Depth (mbgl)	Description
0 - 0.3	Light brown-grey wet CLAY
0.30 - 0.45	Light orange-brown and grey mottled CLAY
0.45 - 0.90	Dark orange (85%) and grey (15%) mottled CLAY
0.90 - 1.30	As above with occasional organic material
1.30 - 1.50	Fully gleyed (100% grey) CLAY with a high organic matter content
1.50	Water strike which rose to 0.2mbgl
1.50 - 2.20	No returns - PEAT
End at 2.20 m	

HMA3 **515393 421409**	
Depth (mbgl)	Description
0 - 0.30	Light brown-grey wet CLAY
0.30 - 0.40	Brown and orange mottled CLAY
0.40 - 1.50	Orange (50%) and grey (50%) mottled CLAY
1.50	Water strike
End at 1.50 m	

HMA4 **515390 421594**	
Depth (mbgl)	Description
0 - 0.30	Light grey-brown CLAY
0.30 - 0.90	Orange (40%) and grey (60%) mottled CLAY
0.90 - 1.20	As above with occasional pockets of organic material
1.20 - 1.50	Orange (40%) and grey (60%) mottled CLAY
End at 1.50 m	

HMA5 **515032 421616**	
Depth (mbgl)	Description
0 - 0.30	Grey-brown CLAY
0.30 - 0.40	Orange and grey mottled CLAY
0.40 - 0.50	Orange (50%) and grey (50%)
0.50 - 1.30	As above with rare pockets of organic material
1.30	Water strike
1.30 - 1.60	Fully gleyed (100% grey) wet soft CLAY
End at 1.60 m	

HMA6 **514912 421792**	
Depth (mbgl)	Description
0 - 0.30	Grey-brown CLAY
0.30	Water strike
0.30 - 0.60	Orange (30%) and grey (70%) mottled CLAY
0.60 - 1.30	Orange (50%) and grey (50%) mottle CLAY with rare organic material
1.30 - 1.50	Fully gleyed (100% grey) CLAY
1.50	Water strike
1.50 - 1.60	Peaty CLAY
1.60 - 1.65	Fine gravelly grey CLAY on tip of auger. Refusal at 1.65 m
End at 1.65 m	

HMA7 **514793 421984**	
Depth (mbgl)	Description
0 - 0.40	Light brown-grey CLAY
0.40 - 0.50	Orange (30%) and grey (70%) mottled CLAY
0.50 - 0.55	Orange (50%) and grey (50%) mottled CLAY
0.55	Water strike
0.55 - 0.65	Brown-grey clayey, fine gravelly, medium grained SAND
0.65 - 1.00	Deep yellow fine gravelly medium grained SAND
1.00 - 1.50	Fully gleyed (100% grey) CLAY

End at 1.50 m

HMA8 **514950 422141**	
Depth (mbgl)	Description
0 - 0.30	Brown-grey CLAY
0.30 - 0.60	Orange (40%) and grey (60%) mottled CLAY
0.60 - 1.10	Orange (10%) and grey (90%) mottled CLAY
1.10 - 1.20	Fully gleyed (100% grey) CLAY
End at 1.20 m	

HMA9 **515113 421967**	
Depth (mbgl)	Description
0 - 0.30	Grey-brown CLAY
0.30 - 0.40	Grey-brown CLAY with organic bands
0.40 - 1.00	Orange (40%) and grey (60%) mottled CLAY
1.00 - 1.20	Orange (20%) and grey (80%) mottled CLAY
1.20	Water strike
1.20 - 1.40	Fully gleyed (100% grey) soft CLAY with pockets of organic material
End at 1.40 m	

HMA10 **515225 421786**	
Depth (mbgl)	Description
0 - 0.30	Grey-brown CLAY
0.30 - 0.40	Orange (20%) and grey (80%) mottled CLAY
0.40 - 0.50	Brick fragments
0.50 - 1.10	Orange (50%) and grey (50%) mottled CLAY
1.10 - 1.50	Orange (20%) and grey (80%) mottled CLAY
1.50 - 1.60	Fully gleyed (100% grey) CLAY
End at 1.60 m	

1.2 Auger Holes excavated on 1st March 2016, logged by Brendon McFadden and Alex Jones

HMA11 **514487 422645**	
Depth (mbgl)	Description
0 - 0.30	Grey-brown CLAY
0.30 - 1.50	Orange (50%) and grey (50%) mottled CLAY
End at 1.50 m	

HMA12 **514830 422654**	
Depth (mbgl)	Description
0 - 0.30	Grey-brown CLAY
0.30 - 0.50	Orange (80%) and grey (20%) mottled CLAY
0.50 - 1.50	Orange (50%) and grey (50%) mottled CLAY
End at 1.50 m	

HMA13 **515005 422345**	
Depth (mbgl)	Description
0 - 0.30	Grey-brown CLAY
0.30 - 0.50	Orange (60%) and grey (40%) mottled CLAY
0.50 - 1.00	Orange (50%) and grey (50%) mottled silty CLAY
1.00 - 1.50	Orange (50%) and grey (50%) mottled CLAY
End at 1.50 m	

HMA14 **514809 422262**	
Depth (mbgl)	Description
0 0.30	Grey-brown CLAY
0.30 - 0.90	Orange (50%) and grey (50%) mottled CLAY
0.90 - 1.20	Orange (20%) and grey (80%) mottled CLAY
1.20 - 1.50	Fully gleyed (100% grey-purple) CLAY
End at 1.50 m	

C Water Quality Analysis

C.1 Introduction

In order to provide an assessment of water quality across the site, five water samples were obtained from key locations across Halton Marshes and dispatched for analysis at a UKAS accredited laboratory for a broad range of contaminants.

It should be noted that the purpose of the assessment is to provide an initial screening assessment of water quality issues in relation to the proposals for future habitat creation and not to provide a detailed assessment of the site within the context of Part IIA of the 1990 Environmental Protection Act.

The sampling locations are given in Table A1 and displayed in Figure A1.

Figure A1 Water quality sampling locations

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Table A1 Water quality sampling locations

Sample Name	Easting	Northing	Location Description
HMWQ1	514779	421860	Standing water in palaeo-channel to the west of the main drain.
HMWQ2	514974	421578	Main drain (site boundary).
HMWQ3	515135	421358	Standing water in palaeo-channel on site.
HMWQ4	515245	421121	Main drain (to the south of the site).
HMWQ5	515273	421182	Pond to the south of the site.

C.2 Results

The results of the water quality analysis are given in Table A2.

Table A2 Water quality results

Determinand	Units	HMW1	HMW2	HMW3	HMW4	HMW5
pH		8.4	8.3	8.3	8.5	8.3
Suspended Solids At 105C	mg/l	20	550	27	12	98
Dissolved Oxygen	mg O_2/l	7.4	6.1	6.7	6.6	6.4
Alkalinity (Total)	mg $CaCO_3$/l	310	170	250	330	280
Chloride	mg/l	380	98	230	72	300
Ammoniacal Nitrogen	mg/l	0.43	0.31	0.26	0.17	0.21
Calcium	mg/l	56	150	140	86	110
Potassium	mg/l	27	11	11	13	14
Sodium	mg/l	220	74	130	41	170
Arsenic (Dissolved)	µg/l	3.3	1.2	1.3	3.6	1.9
Iron (Dissolved)	µg/l	< 20	< 20	< 20	< 20	< 20
Manganese (Dissolved)	µg/l	1.6	30	160	8.1	130
Nickel (Dissolved)	µg/l	1.9	2.3	2.1	4.6	2.0
Lead (Dissolved)	µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (Dissolved)	µg/l	3.4	10	7.2	8.1	10
Dissolved Organic Carbon	mg/l	18	18	15	24	15
Salinity	ppt	0.69	0.18	0.42	0.13	0.54

D Water Budget

Halton Marshes Water Budget - Technical Note

1 Introduction

This technical note describes the basis of the water budgets used to assess the potential for wetland creation in the Halton Marshes Area. Three types of water budget have been presented:

- A basic water budget used to assess how far into a summer period a surface water body could persist if full at the end of the previous winter and receiving no water inputs through the spring-summer period.
- A mass balance catchment water budget assessing the volumes of water on a month by month bases which would be supplied to and held within surface water bodies used to create a wetland habitat (using a combination of scrapes and pools).
- Third water budget combining conservative assumptions from both.

Once the water budgets have been presented, analysis for the potential to pump water from the main drain is presented.

2 Data Sources

The following data sources have been used within the assessment:

- MORECS (Met Office Rainfall Evapo-transpiration Calculation System, which provides climatic data on a 40km x 40km grid basis across the UK) monthly data for the area which includes the Halton Marshes Site (MORECS square 101),
- Topographic data using LIDAR,
- Lowflows data.

3 Basic Water Budget

3.1 Introduction and Methodology

The wetland conceptualisation in the main assessment identifies that the site is underlain by low permeability clays (based on ground investigation data obtained from the site). Lateral groundwater movement onto and off the site will therefore be limited. Scrapes and other surface water bodies will therefore be supplied primarily by surface water run-off. Water losses from the open water bodies will take the following form:

- Surface water discharges - when the scrapes or pools are full and a surface water discharge route (spill) can open up though overtopping.
- Lateral groundwater movement - which will be limited by the low permeability clay.
- Evaporative losses.

To understand how long a scrape or pool will persist into the summer a direct rainfall - evaporation water budget for the scrapes has been developed with the following assumptions, which are considered reasonable based upon our existing level of knowledge of the site and the surrounding environment:

- The only water input during the target habitat period into the scrapes is direct rainfall (this is a conservative assumption as the low permeability clays are likely to generate some surface water run-off). Rainfall data is based on monthly MORECS data obtained for Square 101 (the square in which the site lies).
- The only output is evaporation. This is not a conservative assumption as despite the low permeability nature of the clays, there will be some limited lateral groundwater movement from the water bodies to the surround ground, when the water table in the surrounding ground drops, although as noted above this is likely to be limited. The evaporation data is based on monthly MORECS data for Square 101.
- Where rainfall is greater than evaporation within a month, net recharge is not added to the total deficit during the target period. This assumption equates to net monthly positive recharge being lost through run-off - i.e. the scrapes cannot hold more than 100% of their volume. This is a conservative assumption, as monthly net positive recharge can happen once water levels in the scrapes have dropped (e.g. a wet May following several dry antecedent months).

3.2 Results

Figure 3-1 shows an example water budget for 1999 (selected at random) based on the use of the MORECS data. It has four key elements:

- Monthly rainfall,
- Monthly evaporation (using open water data to best reflect losses from the scrapes),
- Net recharge - i.e. monthly rainfall minus monthly evaporation,
- Deficits excluding positive recharge.

The figure shows the total deficit (i.e. the summation of the deficits) during the two critical water level target periods in 1999:

- February to End of September for Black Tail Godwits = 246 mm
    - i.e. there is water available in the driest time of year from late summer to early Autumn.
- February to End of July for the other target species = 221.5 mm

It should be noted that there are autumn and winter water level targets for the site, notably the water level target period for Black tail Godwits extends from August to March. However, this water budget focuses on the sensitive (drier) periods of the year. If water bodies persist through these periods, then they should persist through the less sensitive (in water balance terms, i.e. cooler and wetter) autumn and winter months.

The total deficits during the target periods for each year between 1986 and 2015 are shown in Table 3-1. Scrapes are expected to have a maximum depth of between 750 and 850mm. Table 3-1 includes a column highlighting those deficits greater than 500mm when residual water levels

in the scrapes would be less than 250mm to 350mm; this occurred twice within the 30 year period. If there is a relatively dry winter period before commencement of the target period, the scrapes may not fill. 500mm represents filling the scrapes to only approximately two thirds capacity. Therefore, a conservative assumption is that for those years with a deficit greater than 500mm following a dry winter, the scrapes may not persist through to the end of either target period noted above. Within the assessed period a deficit of 500mm occurred during the longer target period twice in thirty years (deficits of 400mm occurred a further four times). In no year was the deficit greater than 400mm in the shorter target period (to end of July).

In the absence of any "artificial" recharge (i.e. introducing water onto the site from an external source) it is concluded using the MORECS data that there is a potential for the scrapes to completely dry our twice in the past 30 years. This is generally as a result of a dry antecedent winter.

The volumetric water budget in Section 4 assesses how full the scrapes and water bodies need to be prior to commencement of the target period.

Figure 3-1: Example Water Budget from 1984

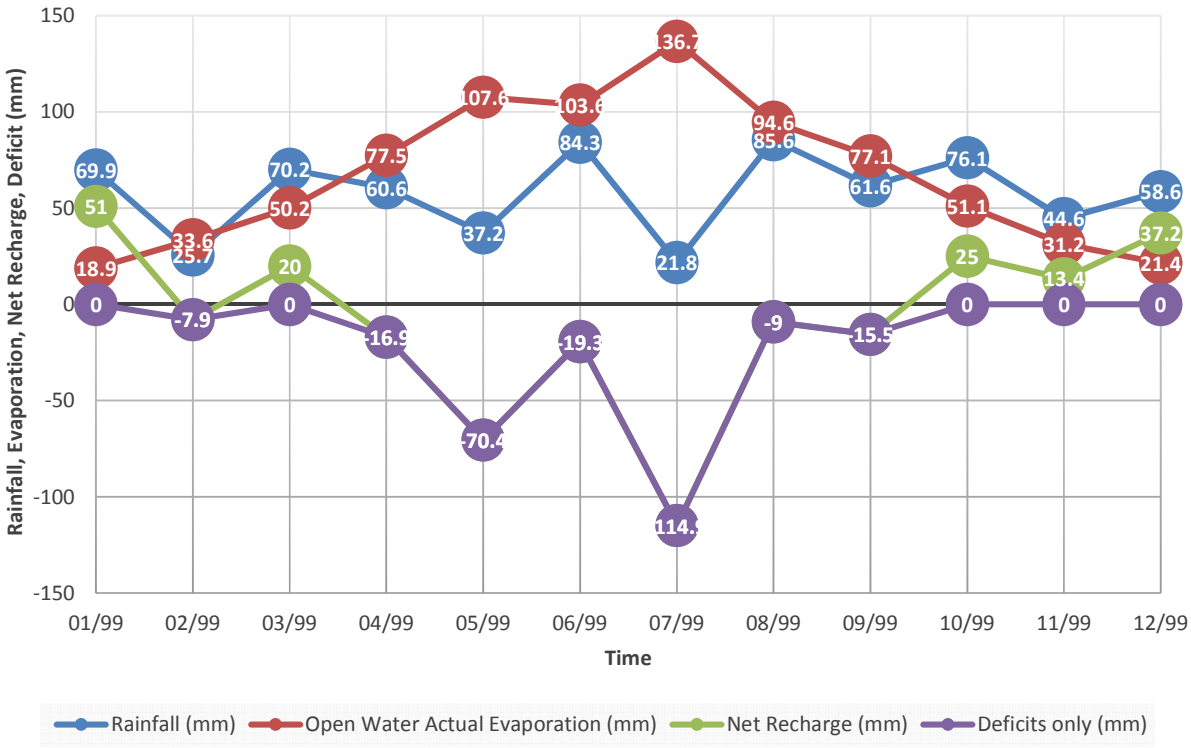


Table 3-1: Total Deficits during the Target Period between 1986 and 2015

Year	Feb - End of July Target Period Deficits for other species (mm)	Feb - End of Sept Target Period Deficits for Black Tailed Godwits (mm)
1986	203.7	273.3
1987	132.1	185.2
1988	152	257.6
1989	242.7	376.1
1990	359.8	503.7
1991	275.7	432.4
1992	208.8	256.3
1993	216	263.8
1994	286.2	363.4
1995	370.7	507.1
1996	348.5	467.6
1997	226.6	331
1998	183.1	286.6
1999	221.5	246
2000	157.5	231
2001	227.5	262.8
2002	228.9	298.6
2003	243.5	399.3
2004	186	239.5
2005	250.1	326.6
2006	283.3	293.7
2007	116.4	255.8
2008	202.6	222.8
2009	261.3	392.7
2010	339.4	371.3
2011	376.2	455.4
2012	140.1	196.8
2013	299.6	429.6
2014	162.7	217.1
2015	259.1	329.7

Overall, this analysis or MORECS rainfall and evaporation data for the site suggests that given the local climate, if the scrapes constructed at the depths anticipated (750mm - 850mm) are able to fill over the winter period, they should persist in all but the very driest years.

4 Volumetric Water Budget

A monthly volumetric water budget has been developed for four wetland design options presented to identify the volume of water that would be contained within surface water bodies within the wetland in each month between the period 1986 and 2015 for which MORECS data has been obtained. In outline, the wetland designs options are:

- Blocking the Halton Marsh Drain with two weirs and feeding water from the open water body created through a series of scrapes. Two sub-options were considered:
  - "Shallow Weirs" where the weirs shallowly inundated the neighbouring ground; and,
  - "Deep Weirs" where the weirs would create deeper bodies of water.
- "Field Scrapes"- A series of linear scrapes fed by direct surface run-off.
- "Tiered Scrapes" - a series of tiered scrapes coupled with the inundation of low lying paleo- channel features on the site.
  - A variation on this is the "Tiered Scrapes with a Catchwater" option, where a catchwater system on the site to the west owned by Able collects surface run-off from the slopes and discharges it to the site. A second variation includes a pump in the main drain which is discussed in Section 6.

These options are described in further detail in Section 6 of the main report and are based upon the broad management option of active water level management through-out the year..

4.1 Rainfall, Evapotranspiration and Evaporation

Rainfall and Actual Evapotranspiration data was used from MORECS square 101, from 01/1986 to 12/2016. Actual evapotranspiration and a high availability soil type (i.e. assuming a high water table) data was used in the water balance calculations. Actual evapotranspiration is an estimate of the quantity of water that is actually removed from a surface due to evaporation and transpiration. It differs from potential evapotranspiration, which is a measure of the ability of the atmosphere to remove water from the surface through evaporation and transpiration. In dry periods, the actual evapotranspiration can be significantly lower than the potential evapotranspiration as there is restricted water available. .

Areal averaging of MORECS evaporation and evapotranspiration data was undertaken in order to account for the variation in vegetation community and land-use across the site, to produce an average evapotranspirational loss for the site. The vegetation/land use areas were attributed to a MORECS category allowing direct use of actual evaporation data. The areas of each vegetation/land use sub-area was estimated using ArcGIS and consisted of the following categories:

- Open water - for the areas of planned scrapes and other water bodies.
- Riperian - for the margins around open water bodies.
- Grassland - the remainder of the catchment/site. It has also been assumed that the rest of catchment is grassland which is a reasonable assumption. Currently this is dominated by arable usage, however the choice of grassland provides relatively high evapotranspiration rates throughout the target period. Arable crops can have higher evapotranspiration rates for particular months in the target period (e.g. winter wheat is likely to have higher evapotranspiration rates in February and March and oil seed rapid higher rates in June and July).

It should also be noted that much of the catchment to the west of the proposed wetland may be developed in the future with hardstanding. This will increase the rate of run-off and should also reduce evapotranspirational loses and thus potentially supply more run-off to the wetland than has been calculated.

The percentage land covers for each option are shown in Table 4-1.

Table 4-1. Percentage covers for MORECS land class for the scenarios derived from ArcGIS

MORECS land class	Field Scrapes	Shallow and Deep Weirs	Tiered Scrapes	Tiered Scrapes with Catchwater
Open water	15	5	22	8.6
Riparian	10	15	10	38.6

Grazing	75	80	68	52.8

Note: the design options with inputs from the rest of the catchment have proportionally smaller areas of open water to support.

Based on the land cover proportions above, the evapotranspiration for each month was calculated as follows.

$$E = [(0.15 \text{ x AE OWT}) + (0.1 \text{ x AE RIP}) + (0.75 \text{ x AE RGZ})]$$

E = Evapotranspiration

AE = Actual Evapotranspiration

OWT - Open Water

RIP - Riparian

RGZ - Rough Grazing

4.2 Storage Capacity

The volumetric water budget was assessed on the basis that from the start of October through to the end of December, there is effectively no water storage within the system - i.e. control structures are left open to allow the site to drain and limit winter flooding. This is a conservative assumption as not all the system will be drained down in October so as to create a mosaic of suitable winter habitats. In January to the end of September, the outfalls can be blocked and weirs raised. The open water capacity of the various designs (in effect the volumes of water needed to fill the system) were assess by two means:

- Capacity of inundated paleo-channels were assessed by analysis of LIDAR data.
- Linear scrapes were assessed on the basis of length and average depth and cross section parameters.

Once the storage capacity is reached, water inputs into the system are deemed to be lost - i.e. once the system is full, additional water cannot be stored and therefore discharges from the system (through the drainage system).

4.3 Assessing Monthly Inputs and Outputs

Monthly inputs into the open water bodies were calculated using the following equation:

$$\text{Input into Open Water body} = (\text{Rainfall} - \text{area adjusted Evapotranspiration}) \text{x Catchment Area}$$

Where inputs into the open water body were negative, transpirative losses from fields were assumed not to affect the volume of water contained with the open water bodies. During the months where the equation above was less than zero; the following equation, which only accounts for net direct evaporative losses from the open water bodies, was used to calculate the flux out of the open water body.

$$\text{Input into Open Water body} = (\text{Rainfall} - \text{Evaporation}) \text{ x Area of Open Water}$$

The area of open water is adjusted linearly based on the percentage of the total capacity of the open water bodies that are full the previous month - i.e. If the system was 80% dry at commencement of the, the area of the open water body in the calculation above is 20% of the maximum area. The assumption is considered valid due to the gentle slopes of the water bodies.

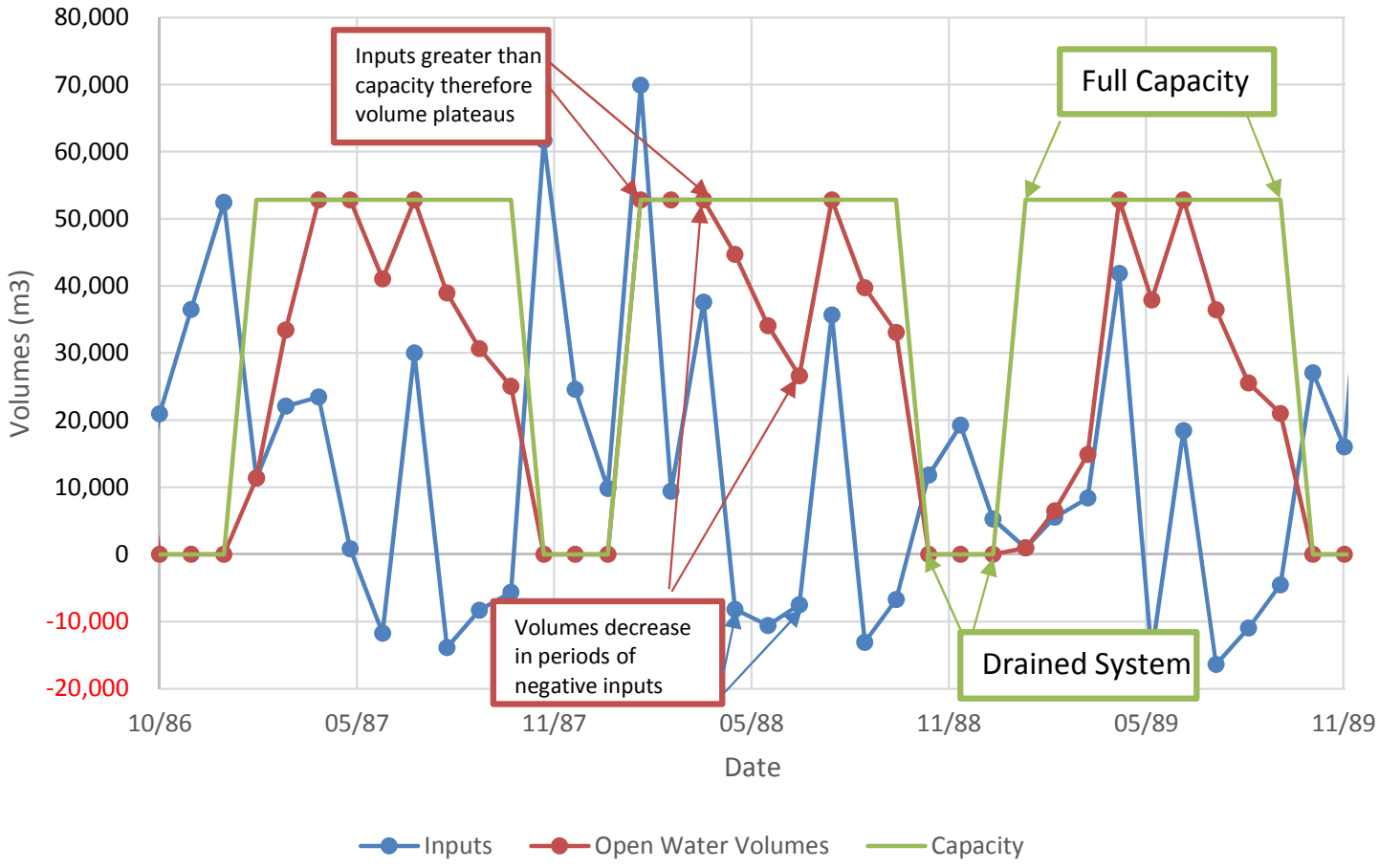
4.4 Example Water Budget

Figure 4-1 shows part of a month by month water budget for the Scrapes Only option from October 1986 to November 1989. It highlights three elements:

- Capacity - the volume of open water that can be held in the system. In the October-December period, this is fixed at zero, i.e. no additional water can be held. In January, the outfalls of the system are blocked/ raised, allowing two months for the system to be re-filled before the end of February.
- Inputs - this is the volume of water inputting into the system per month (as described in Section 4.3).

- Open Water Volume - this is the volume of water contained within the open water bodies. It is the summation of the inputs and outputs from the system, unless the maximum or minimum capacity is reached (i.e. once the system is full or empty it cannot became more full or empty).

Figure 4-1: Example of a Monthly Water Budget for the Scrapes Only Scenario



4.5 Failure Thresholds

For the habitat targets to be met, the scrapes have to hold water at the end of the target period. The nature of the scrape design (linear and shallowly sloped) means that they should provide significant edge habitat until they are almost dry. The thresholds for achieving the targets have therefore been set as:

- Scrapes holding 0.2m depth of water 1.125m in width;
- The paleo channel inundated areas at 10% of their original area, holding 0.1m of water.

4.6 Results

Table 4-2 shows the results of the volumetric water budget for the different options assessed over the period 1986-2015. The table indicates (by means of a simple Pass or Fail criteria) for each year whether two conditions have been achieved:

- Is the system full by the end of February of each year?
    - The systems are blocked in December and given up to the end of February to fill.
    - The scenarios with the relatively larger volumes (Deep Weirs) or small catchments (Tiered Scrapes) failed this test more frequently in the absence of any external water source.
    - This test is however less important than the second test, namely:
- Is the threshold at the end of July or September passed?

- The tests are described in Section 4.5 and relate to whether the system is too dry at the end of July or September (i.e. do water levels drop below a critical level). The tests also indicate whether any individual month within the target period was also a "Fail" (e.g. scrape dried out on June but were wet at the end of July would be a failure).
- The only scenario to fail this test consistently was the Shallow Weir Scenario. This is because the average depth of water in the scenario was circa 0.18m (at least 50% shallower than the other scenarios). The water bodies were thus deemed not to be deep enough to regularly persist through the target period.

Overall the analysis indicates the following:

- The shallow weir scenario regularly fails to be sufficiently full at the end of September, as it is unable to store sufficient water to prevent potential drying out. For the other scenarios, if they are shown to fail, they only do so in extremely dry years.
- The scenarios where water is collected from a wider catchment than the site (the shallow and deep weirs and the tiered scrapes with a catchwater), were more regularly full by the end of February, as they received inputs from a wider area.

Table 4-2: Year Summary of the Volumetric Water Budget Results for the Scenarios

	Deep Weir			Shallow Weir			Field Scrapes			Tiered Scrapes			Tiered Scrapes with Catchwater		
Year	Full System in Feb	Threshold end of July	Threshold end of Sept	Full System in Feb	Threshold end of July	Threshold end of Sept	Full System in Feb	Threshold end of July	Threshold end of Sept	Full System in Feb	Threshold end of July	Threshold end of Sept	Full System in Feb	Threshold end of July	Threshold end of Sept
1986	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
1987	PASS	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
1988	PASS	PASS	PASS	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
1989	FAIL	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	FAIL	PASS	PASS
1990	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
1991	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
1992	FAIL	PASS	PASS	FAIL	PASS	PASS	FAIL	PASS	PASS	FAIL	PASS	PASS	FAIL	PASS	PASS
1993	FAIL	PASS	PASS	FAIL	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	FAIL	PASS	PASS
1994	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
1995	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
1996	PASS	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
1997	FAIL	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	FAIL	PASS	PASS
1998	FAIL	PASS	PASS	FAIL	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	FAIL	PASS	PASS
1999	PASS	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
2000	FAIL	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
2001	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
2002	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
2003	PASS	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
2004	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
2005	PASS	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
2006	PASS	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS

	Deep Weir			Shallow Weir			Field Scrapes			Tiered Scrapes			Tiered Scrapes with Catchwater		
Year	Full System in Feb	Threshold end of July	Threshold end of Sept	Full System in Feb	Threshold end of July	Threshold end of Sept	Full System in Feb	Threshold end of July	Threshold end of Sept	Full System in Feb	Threshold end of July	Threshold end of Sept	Full System in Feb	Threshold end of July	Threshold end of Sept
2007	PASS	PASS	PASS	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
2008	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
2009	PASS	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
2010	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
2011	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
2012	FAIL	PASS	PASS	FAIL	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	FAIL	PASS	PASS
2013	PASS	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS
2014	PASS	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
2015	FAIL	PASS	PASS	PASS	FAIL	FAIL	FAIL	PASS	PASS	FAIL	PASS	FAIL	PASS	PASS	PASS

5 Combined Water Budget

The analysis presented in Section 3 produced a water budget for scrapes based on the evaporative losses from an open water body through the target periods. It is limited insofar as it does not assess how full the scrapes would be at the start of the target periods, which is an important consideration in assessing their "longevity". However, the volumetric water budget in Section 4 does this. The volumetric water budget also estimated whether the scrapes would hold sufficient water at the end of the target period (in line with the criteria outlined in Section 4.5). Table 5-1 presents an additional analysis to assess whether the thresholds are likely to be met through combining the two water budgets in the following way:

- Identify the percentage to which the scrapes are full based on the volumetric water budget.
- Convert this percentage into a depth of water in a typical scrape.
    - The cross section parameters of a scrape was simplified to a triangle 0.75m deep and 4.5m wide when full, which is not unreasonable.
- The depth of water in the scrape in February is subtracted from the open water losses in the target period calculated in the basic water budget to produce the depth of water at the end of July or September.

By this measure, only in one year (1989) did the scrapes, in all scenarios fall to 0.1m depth of water remaining by the end of September.

The scenarios where water was only available from rainfall falling on land adjacent to the scrapes more regularly did not fill by the end of February and were much more likely to be low (below 0.2m depth) at the end of July or September. In the Tiered Scrapes and Catchwater scenario, the additional water from a wider catchment than just the site allowed the scrapes to persist.

Table 5-1: Combined Water Budget for Scrape Options

Year	Feb - End of July Target Period Deficit (mm)	Feb - End of Sept Target Period Deficit (mm)	Field Scrapes			Tiered Scrapes			Tiered Scrapes and Catchwater		
			Scrape Depths in Feb in m	Water Depth in End of July (m)	Water Depth in End of Sept (m)	Scrape Depths in Feb in m	Water Depth in End of July (m)	Water Depth in End of Sept (m)	Scrape Depths in Feb in m	Water Depth in End of July (m)	Water Depth in End of Sept (m)
1986	0.20	0.27	0.75	0.55	0.48	0.73	0.53	0.46	0.75	0.55	0.48
1987	0.13	0.19	0.60	0.47	0.41	0.56	0.43	0.38	0.75	0.62	0.56
1988	0.15	0.26	0.75	0.60	0.49	0.75	0.60	0.49	0.75	0.60	0.49
1989	0.24	0.38	0.26	0.02	-0.11	0.24	-0.01	-0.14	0.45	0.21	0.08
1990	0.36	0.50	0.75	0.39	0.25	0.75	0.39	0.25	0.75	0.39	0.25
1991	0.28	0.43	0.75	0.47	0.32	0.71	0.44	0.28	0.75	0.47	0.32
1992	0.21	0.26	0.45	0.24	0.19	0.42	0.21	0.16	0.69	0.48	0.43
1993	0.22	0.26	0.46	0.24	0.19	0.42	0.21	0.16	0.71	0.50	0.45
1994	0.29	0.36	0.75	0.46	0.39	0.75	0.46	0.39	0.75	0.46	0.39
1995	0.37	0.51	0.75	0.38	0.24	0.75	0.38	0.24	0.75	0.38	0.24
1996	0.35	0.47	0.70	0.35	0.23	0.66	0.31	0.19	0.75	0.40	0.28
1997	0.23	0.33	0.44	0.21	0.11	0.41	0.18	0.08	0.72	0.49	0.39
1998	0.18	0.29	0.65	0.47	0.36	0.60	0.42	0.31	0.70	0.52	0.41
1999	0.22	0.25	0.66	0.44	0.42	0.59	0.37	0.35	0.75	0.53	0.50
2000	0.16	0.23	0.46	0.30	0.23	0.43	0.27	0.20	0.75	0.59	0.52
2001	0.23	0.26	0.75	0.52	0.49	0.75	0.52	0.49	0.75	0.52	0.49
2002	0.23	0.30	0.71	0.48	0.41	0.66	0.43	0.36	0.75	0.52	0.45
2003	0.24	0.40	0.71	0.46	0.31	0.66	0.42	0.26	0.75	0.51	0.35
2004	0.19	0.24	0.75	0.56	0.51	0.75	0.56	0.51	0.75	0.56	0.51
2005	0.25	0.33	0.51	0.26	0.18	0.47	0.22	0.15	0.75	0.50	0.42
2006	0.28	0.29	0.54	0.25	0.24	0.50	0.22	0.21	0.75	0.47	0.46

2007	0.12	0.26	0.75	0.63	0.49	0.75	0.63	0.49	0.75	0.63	0.49
2008	0.20	0.22	0.75	0.55	0.53	0.75	0.55	0.53	0.75	0.55	0.53
2009	0.26	0.39	0.74	0.48	0.35	0.70	0.44	0.31	0.75	0.49	0.36
2010	0.34	0.37	0.75	0.41	0.38	0.75	0.41	0.38	0.75	0.41	0.38
2011	0.38	0.46	0.75	0.37	0.29	0.72	0.35	0.27	0.75	0.37	0.29
2012	0.14	0.20	0.40	0.26	0.20	0.37	0.23	0.17	0.62	0.48	0.42
2013	0.30	0.43	0.60	0.30	0.17	0.56	0.26	0.13	0.75	0.45	0.32
2014	0.16	0.22	0.75	0.59	0.53	0.75	0.59	0.53	0.75	0.59	0.53
2015	0.26	0.33	0.50	0.24	0.17	0.47	0.21	0.14	0.75	0.49	0.42

6 Water Supply through Pumping

6.1 Introduction

In Section 5, it was shown that options which gather water from a larger catchment than just the site were more likely to fill the scrapes by the end of February and for all of them to persist into July and September.

In the Tiered Scrapes with a catchwater option, the catchwater in the scenario represented a quarter of the main drain catchment at the point at which it enters the site. If water from the main drain is utilised to supply the site, rather than a using catchwater, the catchment available for supply would be significantly larger. However, due to the relative elevations, between the site and the drain pumping would be necessary to draw water from the drain. This section looks at the practicality of pumping from a water quantity perspective.

In relation to a pumped supply from the drain relative to a "passive" catchwater option a number of additional factors would need to be considered:

- A pump will need to be managed, operated and maintained;
- Pumping would not be possible when there are low flows in the drain for efficiency and ecological reasons.

Overall therefore, pumping is only suitable for collecting water when there is a moderate flow in the drain. The sections below assess whether there is likely to be sufficient flow for a sufficient duration in the main drain, in periods when the scrapes need topping up (i.e. the site is dry).

6.2 LowFlows Analysis of Main Drain

LowFlows1 software has been used to estimate the annual and monthly average flow duration curve for the main drain at the proposed abstraction point. This is supported by on-going spot gauging of flows in the drain by JBA staff to validate the model output.

The Q95 (daily mean flow which is expected to be exceeded 95% of the time) was used as a low flow indicator. It was assumed that no abstraction through pumping can take place at flow values equivalent, or less than the Q95.

The annual, March and August flow duration curve information obtained using LowFlows is listed in Table 6-1 and the flow duration curve for all months is shown in Figure 6-1. These indicate that the annual Q95 is 3 litres per second (= 0.003m3/s). In March, the annual Q95% flow occurs less than 5% of the time, whereas in August it occurs in an average year for more than 40% of the time (June, July and September show very similar patterns to the August curve). These are values for average years, rather than for dry years where pumping is more likely to be required.

This first stage of the analysis suggests that the drain should not be relied on as a source of water in the summer months. However, the February, March and April flow duration curve, show greater flows than the average over the whole range. This suggest that water will be more regularly available during these periods. The basic water budget in Section 3 indicates a maximum deficit of 507mm. If the scrapes (0.75m deep) are filled through pumping (if necessary) before the start of, or in the first couple of months of the target period, they should therefore persist.

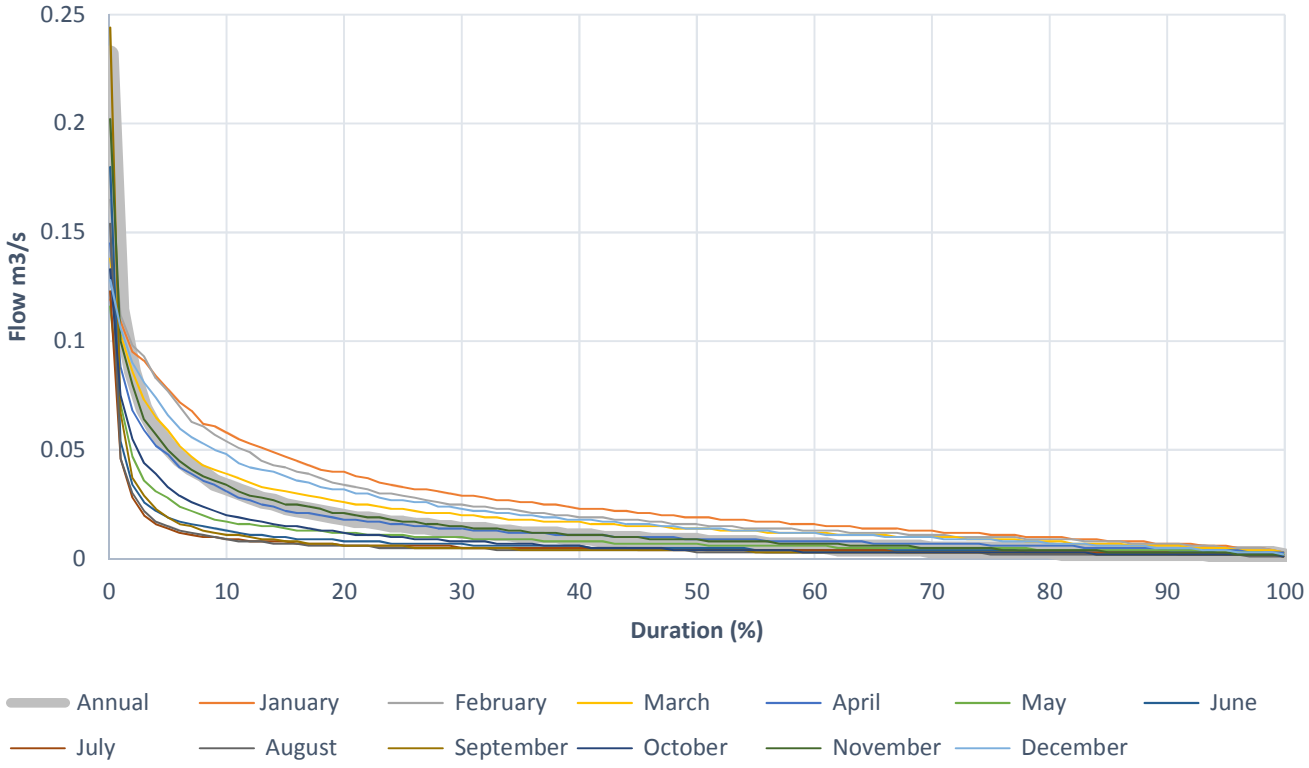
Table 6-1: Summary Flow duration curve estimates

Percentile	Annual Flow Duration Curve m3/s	March Flow Duration Curve (m3/s)	August Flow Duration Curve (m3/s)
Qmean	0.015	0.021	0.006

1 LowFlows 2 estimates flow characteristics on ungauged watercourses by using a region of influence approach whereby estimates are developed using catchment characteristic information (such as rainfall and soil information) from similar catchments around the UK.

Q1	0.115	0.138	0.154
Q5	0.052	0.103	0.046
Q10	0.033	0.059	0.015
Q20	0.019	0.039	0.009
Q30	0.013	0.026	0.006
Q40	0.01	0.02	0.005
Q50	0.008	0.017	0.004
Q60	0.006	0.014	0.003
Q70	0.004	0.012	0.003
Q80	0.004	0.01	0.003
Q90	0.003	0.008	0.002
Q95	0.003	0.006	0.002

Figure 6-1: Annual and Monthly Flow Duration Curves from low flows



6.3 Water Budget Comparison with LowFlows

LowFlows 2 provides flows for mean years. In order to understand the range of flows, a volumetric water budget for the whole catchment has been developed. This has a very similar basis to the water budgets described in Section 4. It estimates the flow at the outfall of the catchment based on the area of the catchment multiplied by the effective recharge. This simple model has limitations:

- It does not taken into account changes in storage:
  - Therefore it is likely to over-estimate flows in autumn as the catchment wets up.
  - Underestimates flows in the summer it cannot take account of the reduction in the storage in the system as the flows are maintained by limited baseflow input.
- It assumes that all net rainfall that lands in a month will be discharged during that month

- This is very similar to the water budget not being able to take account of changes in storage.
- It is also the reason that negative flows are calculated as it does not take into account slow limited releases of baseflow during the summer months

Table 6-2 presents the result of the water budget estimates on monthly mean flow against the Lowflow estimates. Two versions are presented, one which averages all the months between 1986 and 2015, and one which presents the average of the months with positive flows. Overall, it can be seen that the water budget approach shows similar results to the LowFlows estimate in terms of monthly flow volumes. As a result, the water budget flow estimates, are utilised in the next section to assess whether it is possible to top up the scrapes at the beginning of the target period to ensure they persist to the end of the target period

Table 6-2: Catchment Volumetric Water Budget and LowFlows Mean Flows

	Water budget Mean Flows (m3/s)		LowFlows Qmean (m3/s)
	Utilising all months	Positive Flow Months Only	
Annual	0.014	0.02	0.015
January	0.036	0.036	0.029
February	0.025	0.026	0.026
March	0.007	0.012	0.021
April	0.006	0.017	0.016
May	-0.022	0.004	0.011
June	-0.004	0.013	0.008
July	-0.005	0.006	0.007
August	0.000	0.007	0.006
September	0.009	0.016	0.007
October	0.034	0.035	0.01
November	0.040	0.040	0.016
December	0.042	0.042	0.023

6.4 Pumping to Fill Scrapes

This section assesses the likelihood of scrape failure at end of September, if the tiered scrapes option is combined with pumping from the drain. The failure of scrapes could occur through a combination of the following:

- High net open water evaporative losses,
- The degree to which the scrapes are full at the beginning of the target period
- If pumping is implemented - the volume of water to that can be pumped from the main drain into the site, in the spring (as there is likely to be limited water available in the summer (see Section 6.2).

Table 6-3 assesses the likelihood of these factors coinciding through the following:

- The open water losses (taken from the simple water budget in Section 3);
- The depth of scrapes at the beginning of the target period (taken from the combined water budget in Section 5);

- The depth of scrapes at the end of the target period without pumping (taken from the combined water budget in Section 5);
- The volume required to fill the scrapes. This is the total possible volume of scrapes minus the maximum volume of water in the scrapes between February and May (based on the volumetric water budget in Section 4);
    - This allows if the scrapes continue to fill with rainfall and run-off through the first part of the target period.
- The volume available to pump from February to May. This is based on the flow calculated by the water budget described in Section 6.3 minus the Q95 volume.
- The last column presents the ratio of volumes between the volume available from the main drain between February and May, and the volume required to fill the scrapes.
    - A value of less than 1 indicates that there would not be sufficient water to fill the scrapes;
    - A value of 5 or less would require a significant proportion of the flows in the ditch to be captured over a four month period which may be difficult to achieve technically.

The results of the analysis suggest that in the 30 year period, there would be 3 years where completely filling the scrapes may be difficult. This coincides with the other factors which would cause the scrapes to fail in one year out of the 30 (in 1997). The other year which was identified in the combined water budget in Section 5 as a significantly dry target period was 1989. The analysis suggest that from February to May 1989 there was 82 times the amount of water available from the drain than would be required to fill the scrapes. The analysis therefore indicates that a correctly utilised pump would have limited the number of years of failure to one in the last thirty. This is a very low rate of failure.

The analysis indicates that pumping, correctly utilised in the spring when water will be available within the drain, will be of significant benefit in limiting the potential for the failure of the scrape system.

Table 6-3: Scrape Top-Up Requirements and Volumes Available to Pump from the Main Ditch

Year	Open Water Loss in Target Period (m)	Scrape Depths in Feb in m	Water Depth in End of Sept Without pumping (m)	Pump Volume Required to fill Scrapes (m3)	Pump Volume Available from Feb to May (m3)	Proportion of Flow to Required Volume
1986	0.27	0.73	0.46	0	349853	N/A
1987	0.19	0.56	0.38	2093	250020	119.5
1988	0.26	0.75	0.49	0	385144	N/A
1989	0.38	0.24	-0.14	3093	253994	82.1
1990	0.5	0.75	0.25	0	242980	N/A
1991	0.43	0.71	0.28	2556	222311	87.0
1992	0.26	0.42	0.16	15189	131509	8.7
1993	0.26	0.42	0.16	5975	68415	11.5
1994	0.36	0.75	0.39	0	115444	N/A
1995	0.51	0.75	0.24	0	83309	N/A
1996	0.47	0.66	0.19	5474	0	0.0
1997	0.33	0.41	0.08	23247	29063	1.3
1998	0.29	0.60	0.31	0	117340	N/A
1999	0.25	0.59	0.35	0	0	N/A
2000	0.23	0.43	0.20	0	279271	N/A
2001	0.26	0.75	0.49	0	118423	N/A
2002	0.3	0.66	0.36	7239	64536	8.9
2003	0.4	0.66	0.26	7128	3609	0.5
2004	0.24	0.75	0.51	0	8212	N/A
2005	0.33	0.47	0.15	14473	75909	5.2
2006	0.29	0.50	0.21	5214	40436	7.8

2007	0.26	0.75	0.49	0	272678	N/A
2008	0.22	0.75	0.53	0	0	N/A
2009	0.39	0.70	0.31	4323	149199	34.5
2010	0.37	0.75	0.38	0	230253	N/A
2011	0.46	0.72	0.27	2292	197487	86.2
2012	0.2	0.37	0.17	0	522975	N/A
2013	0.43	0.56	0.13	4886	416826	85.3
2014	0.22	0.75	0.53	0	563322	N/A
2015	0.33	0.47	0.14	20189	299033	14.8

E Natural England Correspondence

Date: 28 October 2011

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Dear Peter

ABLE UK MARINE ENERGY PARK (AMEP)

Thank you for your email of 24 October and most recent letter, received on 26 October 2011. We welcome your proposal to "agree to disagree" on a number of matters and seek to agree a pragmatic way forward.

I committed to responding to you this week on two points; the footprint of the development site and the mitigation proposals. Our comments are therefore given below. We will provide a substantive response to the other key points raised in your correspondence next week.

Area of the proposed development site
We acknowledge that the statement under point 1 in our letter of 21 October could have been clearer. We recognise that some of the area proposed for AMEP is currently consented and developed and therefore not all of the AMEP development site footprint is functioning habitat that will be permanently lost to SPA and Ramsar waterbirds. However, there will clearly be a significant change of use from the existing car storage to a new port facility and the impact of this must be adequately assessed under the EIA Regulations and the Habitats Regulations.

The documentation that we have recently received presents a number of differing figures for the land that is currently undeveloped; this figure varies from 102ha in your letter of 29 September to 154ha shown on the drawing attached to your email of 14 October. In your most recent letter it is stated that "planning consent already covers 122ha of that land", however the attachment to that letter lists planning permissions with a total area of 117ha. **We would be grateful if you could provide clarity on these figures.**

However, it is important to clarify that our advice on the amount of mitigation required for the loss of roosting and foraging habitat at Killingholme Marshes is based on the bird monitoring records of the area. This provides information on the actual fields utilised by waterbirds and so the areas already developed were not included in our calculations.

Mitigation principles
As you are aware, it is our advice that a core area of 16.7ha with a buffer of 150m where the adjacent land use is unsecured would be sufficient to mitigate for the loss of terrestrial feeding and roosting habitat within Killingholme Marshes. We welcome your acceptance of our advice and proposal "to include a 16.7ha core mitigation area within the red line boundary that we have used in our statutory consultations".

As discussed at our meeting in Peterborough it may be possible to reduce the 150m buffer along the sides adjacent to the fuel depot and the development site to 100m if further information is provided on the levels and types of activity that will be carried out on these sites. **We would be grateful if you could send this information through to us, as agreed in Peterborough, as soon as possible for our consideration.**

It is unclear what is meant by your statement that the core area will be buffered by "150m of farmland". All of the mitigation area, including the buffer must be optimally managed as wet grassland. This has been discussed previously and was one of the principles agreed in the MOU for ALP "Memorandum of Understanding For Able UK East Halton Application, 24th February 2011" signed by yourself, Peter Nottage Natural England and Peter Robertson RSPB. The reason that the entire area must be managed as wet grassland is to ensure that the core area is optimal at all times. If the surrounding buffer was an alternative habitat type then it would be almost impossible to ensure that the water levels and habitat quality within the entire core area was optimal wet grassland. As you are aware, the purpose of the buffer is to reduce disturbance to the core area so that the entire 16.7ha is able to function optimally at all times. It will not be possible therefore to farm the buffer as this will cause disturbance to the SPA/ Ramsar waterbirds. Subject to your confirmation on these points,

It is Natural England's opinion that this option of delivering sufficient mitigation within the footprint of AMEP would meet the requirements of the Habitats Regulations and mitigate the loss of feeding and roosting habitat from Killingholme Marshes.

Alternative mitigation options
Whilst the mitigation option described above would, in our view, meet the requirements of the Habitats Regulations, you have made it clear that you wish (and will plan) to mitigate for the loss of Killingholme Marshes at AMEP alongside the mitigation that you are providing for ALP. As discussed in Peterborough, we accept that there are alternative options where mitigation can be delivered in close proximity to AMEP but still within the South Humber Gateway and therefore these options would also meet the requirements of the Habitats Regulations and mitigate for the loss of feeding and roosting habitat at Killingholme Marshes.

Option 1
The option that was discussed in Peterborough was for the provision of a 20ha core area to partially mitigate for ALP and a 16.7ha core area to mitigate for AMEP – ie a 36.7ha core area. This would be surrounded by a 150m buffer, except adjacent to the seawall where a buffer of 50m was agreed if public access was screened. To complete the mitigation for ALP, this option also requires a 20ha core area surrounded by 150m buffers where the adjacent land is unsecured, outside of the South Humber Gateway. The location of this offsite

mitigation would be agreed with Natural England and would need to follow the principles of the South Humber Gateway and the Habitats Regulations in respect of delivering the conservation objectives for the site. All of the land should be optimally managed as wet grassland.

Option 2
Drawing No. ALP 08039 A attached to Neil Etherington's email of 14 October shows a core area of 48ha and as stated in our previous letter, if the core area is amended to 32ha + 16.7ha – ie a total core area of 48.7ha with a 150m buffer, except adjacent to the seawall where a buffer of 50m was agreed if public access was screened, then Natural England is of the opinion that this option would also meet the requirements of the Habitats Regulations.

Our advice is that option 2 represents the best option for the designated site, as it would create a large mitigation area in the closest proximity to the impacts of ALP and AMEP. However we advise that **there are three options – one on AMEP and two on ALP that we believe would all enable the impact of the loss of feeding and roosting habitat from Killingholme Marshes to be mitigated**.

Able UK has also put forward a number of other options that result in a reduction in the area of mitigation provided on the ALP site. As Natural England provided clear advice at our meeting in Peterborough that mitigation for AMEP could be moved to ALP, not to a location outside the South Humber Gateway, we assume that these options are proposals to amend the existing planning permission for ALP.

Your letter also states that "other alternatives may emerge and we would hope that you maintain an open mind in any future discussions". Obviously, Natural England is happy to keep an open mind and work with you on mitigation proposals, but we understood that there was a pressing timeframe to deliver AMEP and therefore submission to the IPC was imminent. We have provided advice on 3 options that, in our view, would meet the requirements of the Habitats Regulations; therefore we would welcome your decision over which one of these options to progress, rather than continued debate of alternative proposals.

In the interests of resolving our discussions on developments within the South Humber Gateway, we do not wish to reopen long and protracted discussions on previous cases. As you will be aware, resolution of ALP took considerable time and effort from a number of parties – Able UK, Natural England, RSPB, North Lincolnshire Council and Peter Barham Environment Ltd. If the mitigation for ALP was considerably revised then North Lincolnshire Council would need to undertake a new assessment under the Habitats Regulations and those parties that signed the MOU would need to be reconsulted and new agreements drawn up. It would seem that the public purse would be better served by advancing a positive outcome for the AMEP proposal that does not rely on significant amendments to the planning permission for ALP which threaten to undo much of the hard work put into that application.

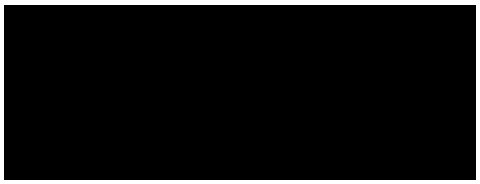
Compensation
We will respond to the compensation proposals in our letter of detail next week.

Drax

As we stated in our previous letter, we are looking into the details of this case and will respond in detail in due course. However, we can assure you that it is unlikely that this will change the advice we have given for AMEP.

I would like to reassure you that we remain committed to regular open and transparent dialogue with Able UK to bring this proposal forward to the point of submission to the IPC as soon as possible. As you are aware, we have a teleconference set up on Wednesday with your team to discuss any outstanding matters.

Yours sincerely



Alan Law
Director, Land Use

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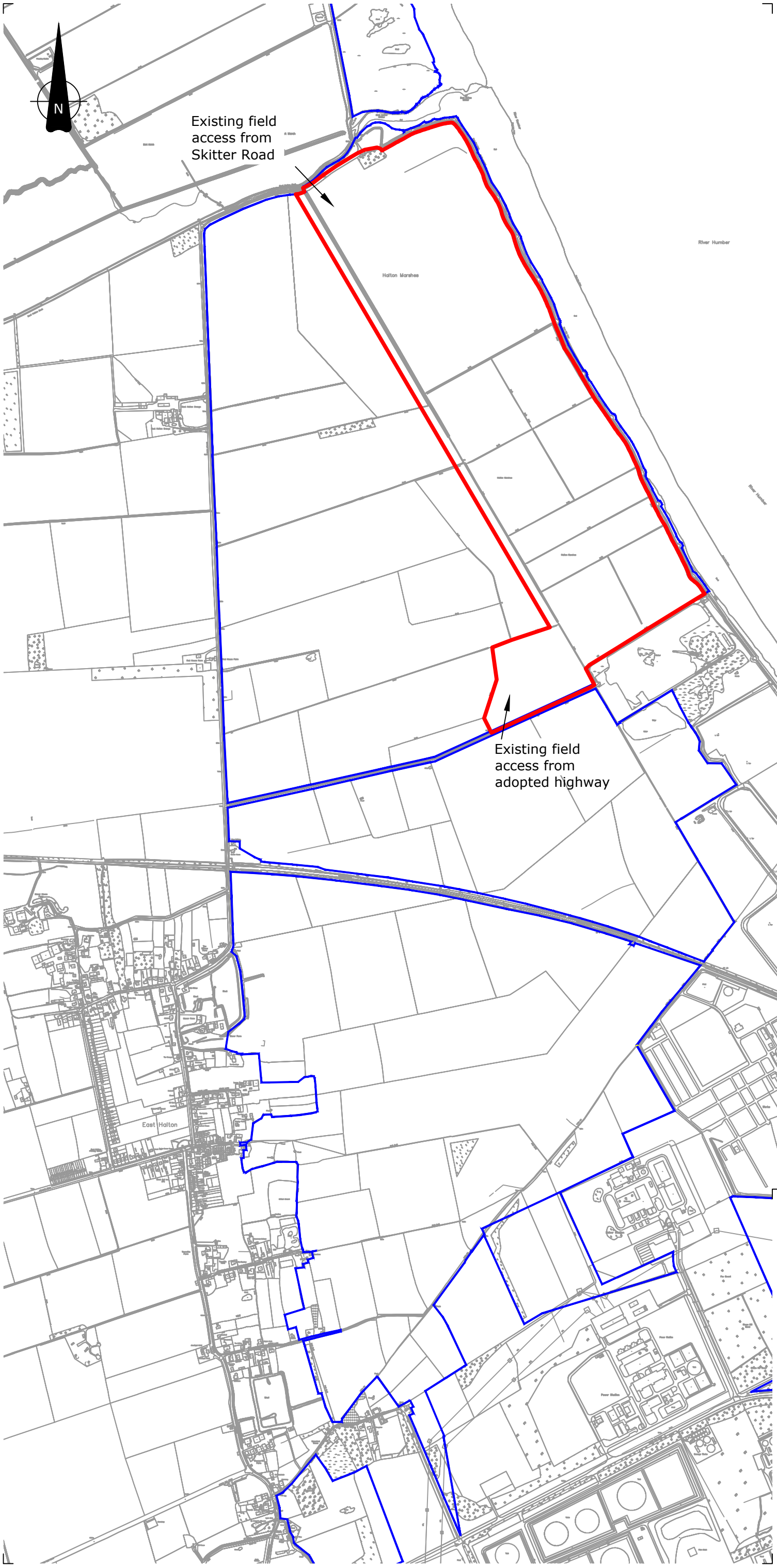
APPENDIX B

Consented Planning Drawings for HMWG



Key & Notes

HMWG Planning Boundary

Land in ownership of the applicant

Rev.	Date	Comments	Drn	Chk	App
A	05/05/2016	Issued for Approval	JMH	DS	RC

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Project: ABLE Logistics Park

Client: ABLE Humber Ports Ltd.

Drawing Title: Halton Marshes Wet Grassland Planning Application Boundary

FOR APPROVAL

Scale:	Drawn By	Checked By	Approved By
1:12,500 @A3	J Horsman	D Sargent	R Cram
Date:	05/05/2016	05/05/2016	05/05/2016

Drawing No: ALP-002-00003 Revision: A

05/05/2016 16:36:22

Remains of former sea defence wall

River Humber

Halton Marshes

Key & Notes

- Planning boundary
- Dense vegetation / hedgerow
- Soke dyke

Rev.	Date	Comments	Drn	Chk	App
C	05/05/2016	Issued for Approval	JMH	DS	RC
B	03/02/2016	Survey Area Extended	JMH	RC	RC
A	28/05/2016	Preliminary Issue	FM	JM	

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Drawing Title: Halton Marshes Wet Grassland Topographical Survey

FOR APPROVAL

Scale:	Drawn By	Checked By	Approved By
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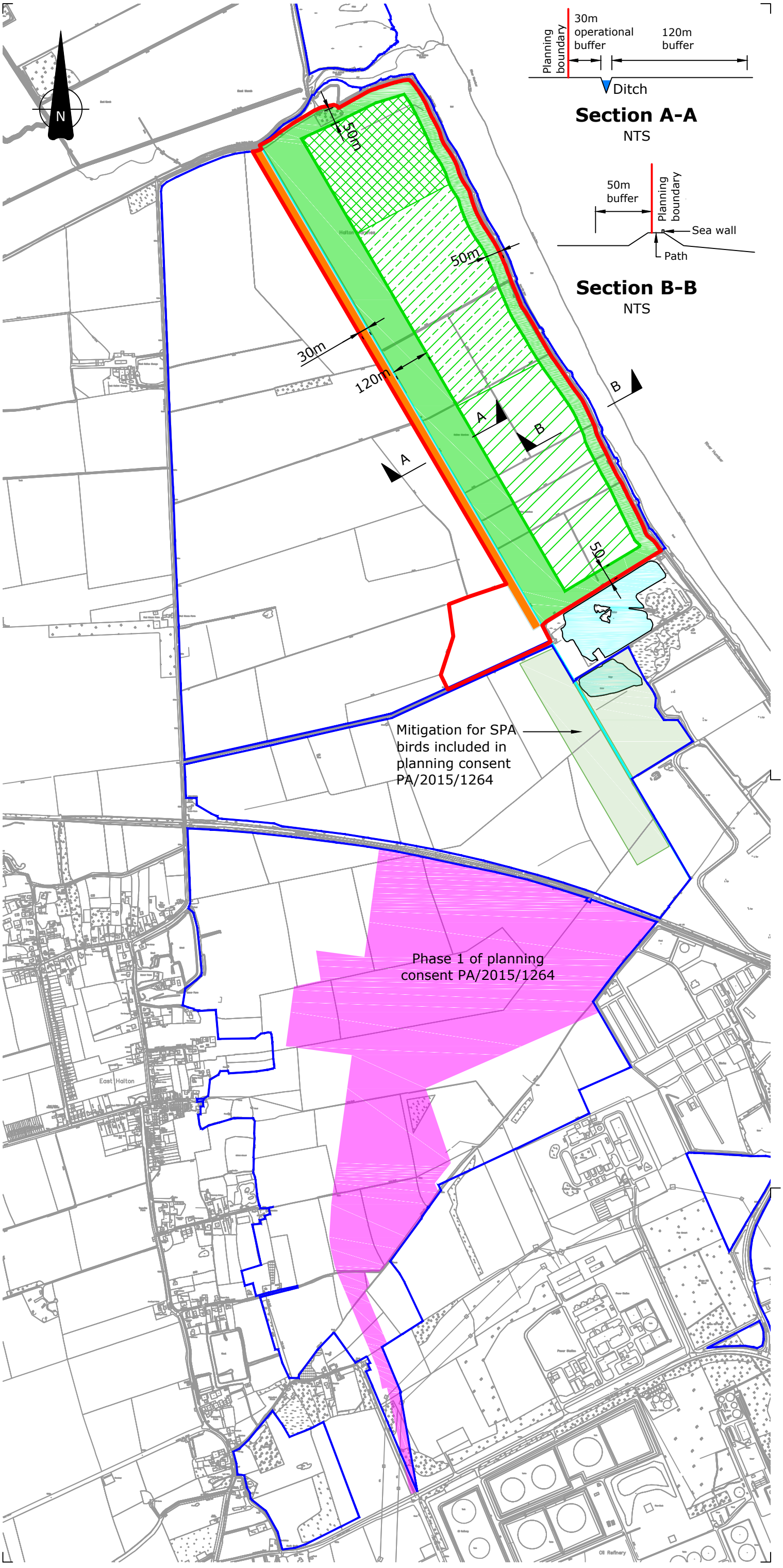
Date:	28/05/2013	31/07/2013	03/02/2016
Drawing No: ALP-002-00006		Revision:	C

06/05/2016 09:07:37



Section A-A
NTS

Section B-B
NTS

Key & Notes

- Planning Boundary
- Land in ownership of the applicant
- Core Area 52.0ha
- Mitigation for Killingholme Marshes (Incorperating Mitigation Area A from AMEP DCO) 20.0ha
- Mitigation For Phase 1 of PA/2015/1264 12.0ha
- AMEP Further Overcompensation (Potential future ALP mitigation) 20.0ha
- Wet Grassland Buffer
- Operational Buffer

Area	Target Species	Critical months
	CU	Aug-Apr
	CU, GP, L, RU	Aug-Apr
	BW	Jul-Mar

Rev.	Date	Comments	Drn	Chk	App
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Client: ABLE Humber Ports Ltd.

Drawing Title: Halton Marshes Wet Grassland Layout Core Area & Buffers

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Scale:	Drawn By	Checked By	Approved By
1:12,500 @A3	J Horsman	D Sargent	R Cram
Date:	05/05/2016	05/05/2016	05/05/2016

Drawing No: ALP-002-00011 Revision: A

06/05/2016 09:11:39

Northern field existing grassland to be retained. Field drains to be blocked to achieve suitable habitat

New ditch & hedgerow

Existing vegetated Soke dyke

Southern fields sown with approved seed mix (for example EG8 wet grassland mix from Emorsgate Seeds)

Halton Marshes

River Humber

N

Key & Notes

- Planning Boundary
- Low lying areas subject to seasonal flooding
- Retained hedgerow/shrubs
- New planting
- New Hedge/Screening
- Bund
- Retained drain
- Scrape
- Existing vegetated soke dyke
- New ditch & Hedgerow

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Client: ABLE Humber Ports Ltd

Drawing Title: Halton Marshes Wet Grassland Proposed General Arrangement

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1:10,000 @A3	J Horsman	D Sargent	R Cram
Date:	05/05/2016	05/05/2016	05/05/2016

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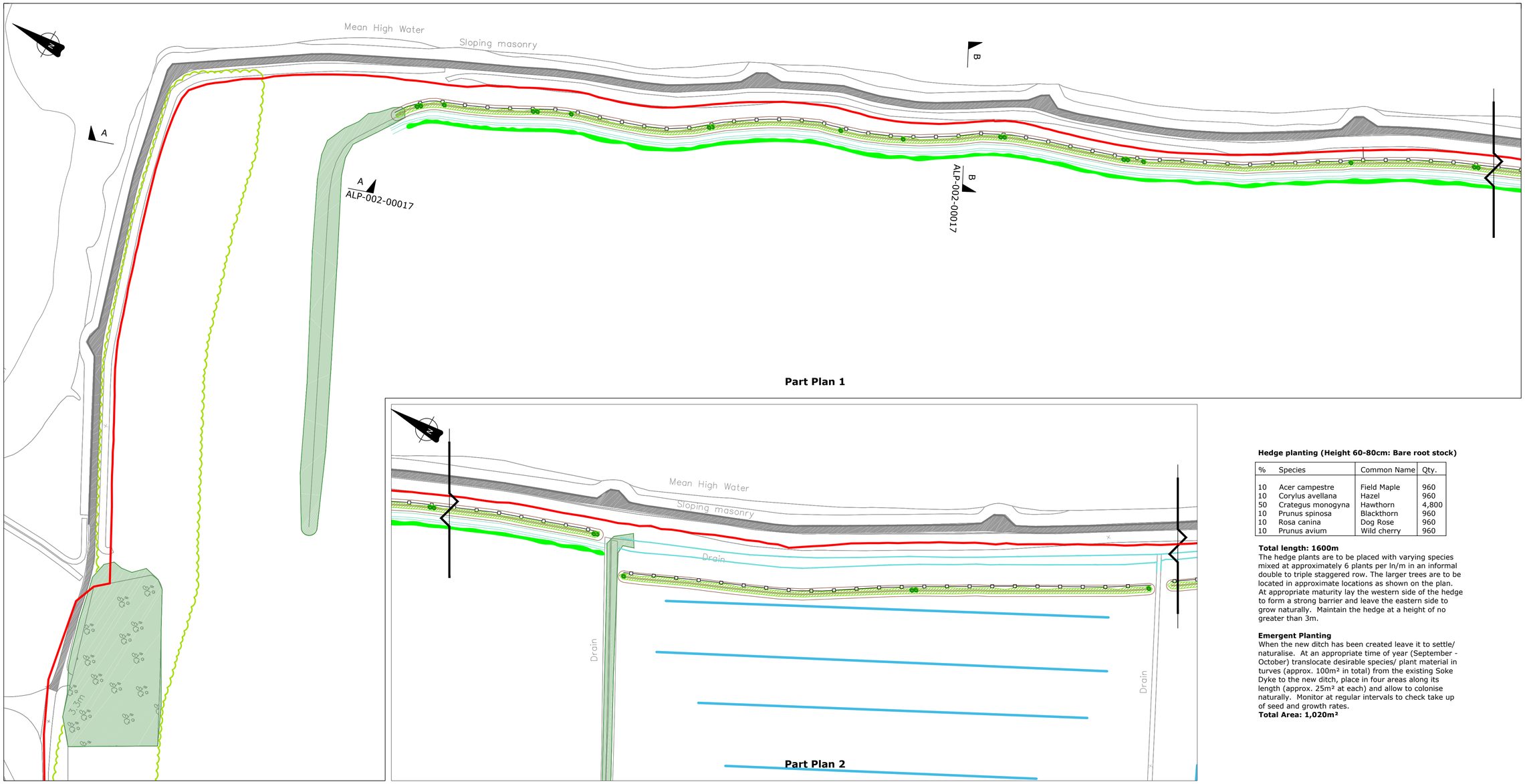


Part Plan 1

Part Plan 2

Part Plan 3

Hedge planting (Height 60-80cm: Bare root stock)

%	Species	Common Name	Qty.
10	Acer campestre	Field Maple	960
10	Corylus avellana	Hazel	960
50	Crategus monogyna	Hawthorn	4,800
10	Prunus spinosa	Blackthorn	960
10	Rosa canina	Dog Rose	960
10	Prunus avium	Wild cherry	960

Total length: 1600m
The hedge plants are to be placed with varying species mixed at approximately 6 plants per ln/m in an informal double to triple staggered row. The larger trees are to be located in approximate locations as shown on the plan. At appropriate maturity lay the western side of the hedge to form a strong barrier and leave the eastern side to grow naturally. Maintain the hedge at a height of no greater than 3m.

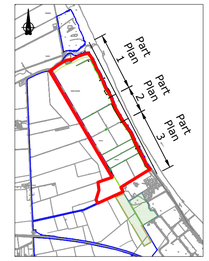
Emergent Planting
When the new ditch has been created leave it to settle/ naturalise. At an appropriate time of year (September - October) translocate desirable species/ plant material in turves (approx. 100m² in total) from the existing Soke Dyke to the new ditch, place in four areas along its length (approx. 25m² at each) and allow to colonise naturally. Monitor at regular intervals to check take up of seed and growth rates.
Total Area: 1,020m²

Key & Notes

- Planning Boundary
- Proposed hedge bank
- Proposed ditch (extension to Soke Dyke)
- Proposed chestnut pale fencing
- Proposed individual trees
- Proposed hedge planting
- Proposed emergent planting
- Existing planting to be retained
- Proposed landscape bund
- Existing seawall
- Proposed scrapes

Notes

1. All new trees and shrubs are to be planted in 'Tubex' tree shelters. All shelters supported by 32 x 32mm x 1.3m tanalised softwood stakes. Each new tree and shrub to have a 'Tubex- thermat' mulch mat, each fixed with 6 pegs per mat.
2. Plant material shall be provided in accordance with BS 3936 Part 1: 1992 'Nursery Stock Specification for Trees & Shrubs'.
3. Good planting conditions and practices should be observed. There should be adequate depth of good topsoil for all planting. Soil ameliorates, i.e. fertilisers to be used as necessary. Topsoil in accordance with BS3882:1994. Planting shall be carried out in accordance with BS 4428:1989 'General Landscaping Operations'.
4. The site should be generally managed to control weed and vermin, particularly rabbits. Any new trees that are found to have died or be diseased within 5 years are to be replaced.
5. Protected Species: - An ecologist should be consulted to check if licences are required prior to starting on site, particularly with the translocating of existing emergent planting.



Location Plan
Not to Scale

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A	05/05/2016	Issued for Approval	JMH	DS	RC

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Drawing Title: Halton Marshes Wet Grassland Planting Plan

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Scale:	Drawn By:	Checked By:	Approved By:
1:1,000 @A1	J Horsman	D Sargent	R Cram
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Drawing No: ALP-002-00013 Revision: A

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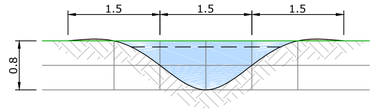
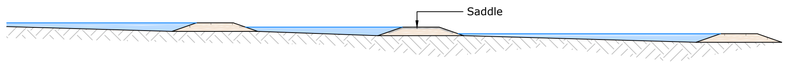
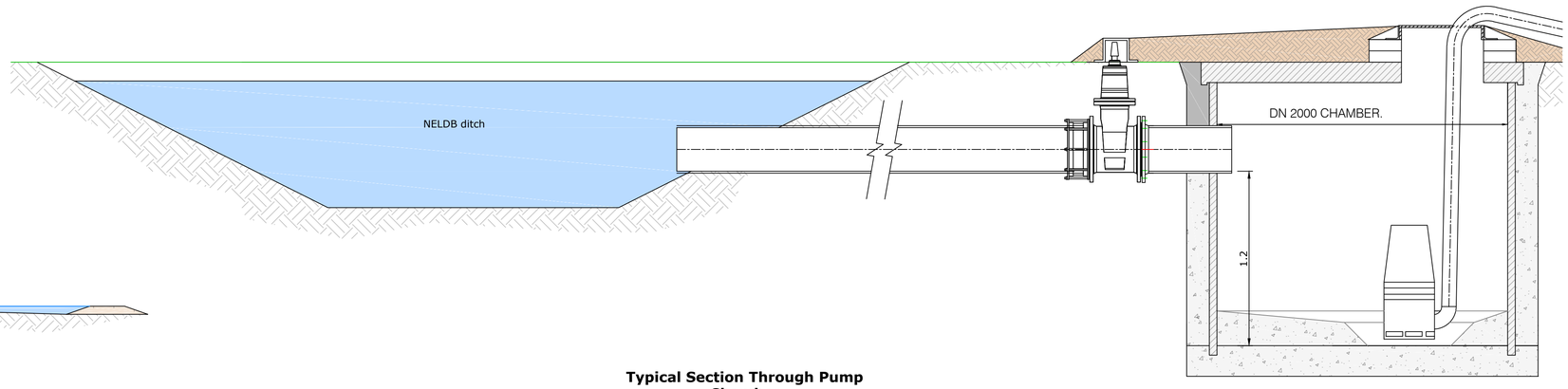


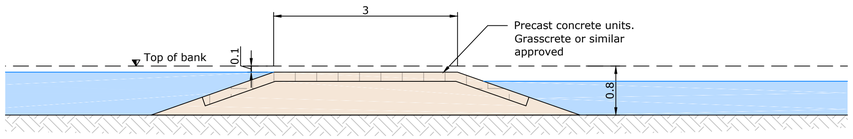
Typical Section Through Scrape
Scale 1:50



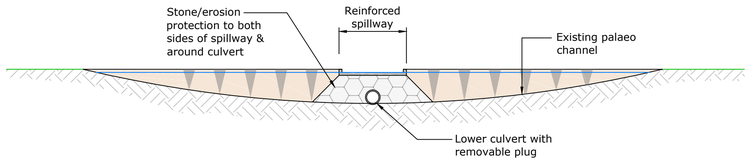
Typical Long Section Through Scrape
Scale NTS



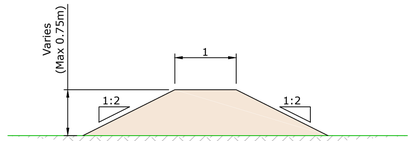
Typical Section Through Pump Chamber
Scale 1:20



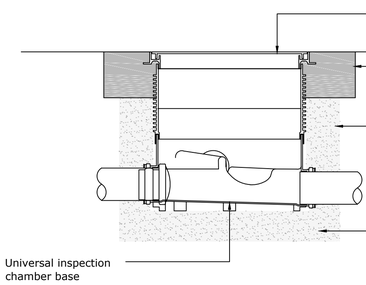
Typical Section Through Saddle
Scale 1:50

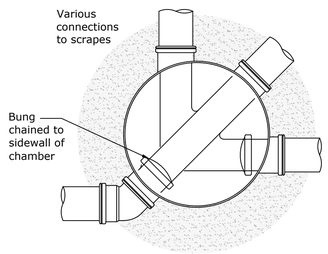


Typical Elevation on Bund with Spillway & Culvert
Not to Scale

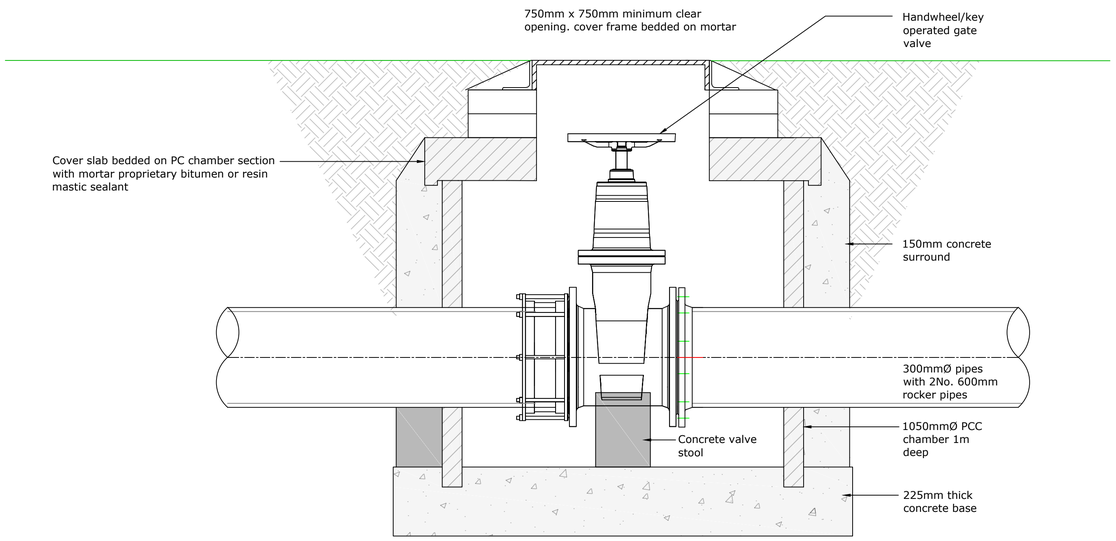


Typical Section Through Bund
Scale 1:50





Bung Chamber Detail
Scale 1:10



Typical Valve Chamber Detail
Scale 1:10

Key & Notes

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Project: ABLE Logistics Park

Client: ABLE Humber Ports Ltd.

Drawing Title: Halton Marshes Wet Grassland Sections & Details

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Scale:	Drawn By	Checked By	Approved By
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Drawing No: ALP-002-00014 Revision: A

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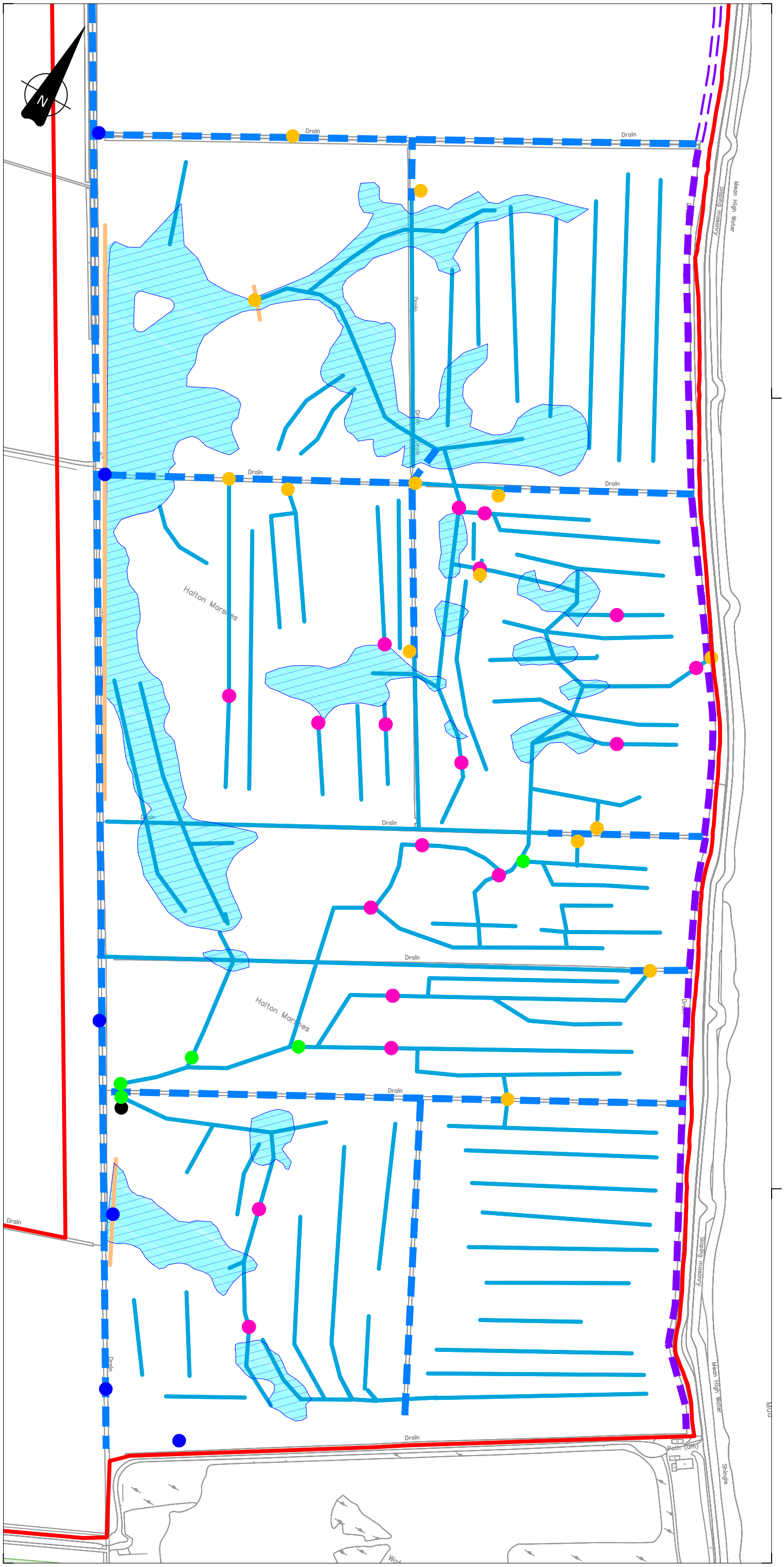

Key & Notes

- Bung
- Saddle
- Valve
- Weir
- Pump
- Retained drain
- Scrape
- Bund
- Soke dyke
- New ditch & hedgerow
- Low lying areas subject to seasonal flooding

Notes

1. Landscaping details omitted for clarity. Refer to ALP-002-00013 for planting details.

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Project: ABLE Logistics Park

Client: ABLE Humber Ports Ltd

Drawing Title: Halton Marshes Wet Grassland Schematic Layout of Scrapes

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Scale:	Drawn By	Checked By	Approved By
1:10,000 @A3	J Horsman	D Sargent	R Cram
Date:	05/05/2016	05/05/2016	05/05/2016

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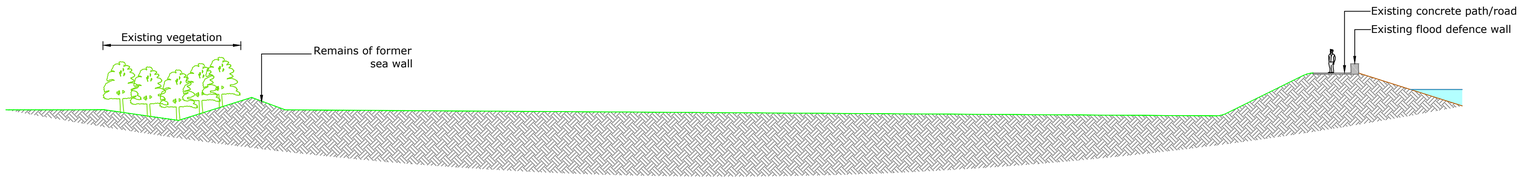
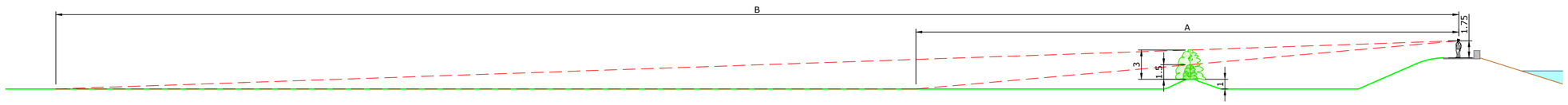


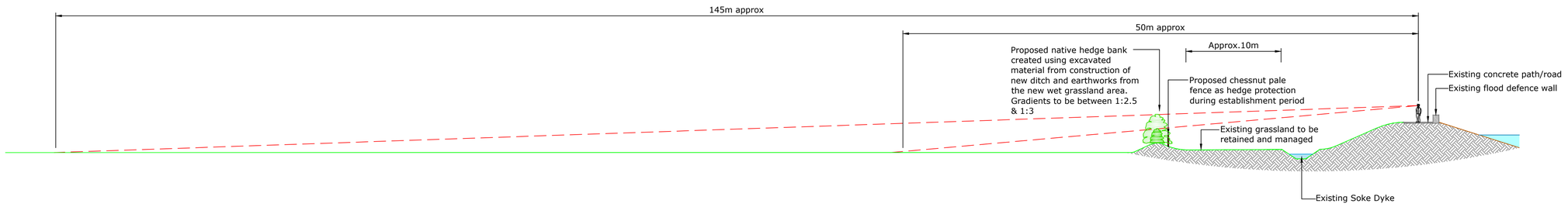
Section A-A
Typical Section Through Existing
Scale 1:200



Sight Lines
Scale 1:250

145m approx

Section B-B
Typical Section Through Proposed Bund and Ditch
Scale 1:250



Section C-C
Typical Section Through Soke Dyke and Proposed Bund
Scale 1:250

Key & Notes

1. For section locations, refer to drawing ALP-002-00013.

Supporting statement - Visual screening assessment.

Initial proposals for the planting scheme contained a number of tree species which were of concern to the RSPB and Natural England as they presented an ideal habitat for predatory species such as crows and raptors.

These have been removed from current proposals.

The association of the proposed new ditch and hedgebank in such that the new ditch be "inside" the hedge. This is to form a more impenetrable barrier to humans and dogs. It will also provide habitat for water vole as well as several of the warbler species currently found along the Soke Dyke.

In order to ensure the proposals provide adequate screening to the proposed wet grassland area, the site has been assessed to determine exactly the height of screening that will need to be provided.

The existing flood bank was walked and the heights of the existing hedgerow vegetation was assessed in relation to the screening it provides.

It was noted that existing hawthorn vegetation along Soke Dyke (where it occurs) effectively screens views of the adjacent fields out beyond the existing drain which will form the western boundary of the proposed site. This is at a semi mature height of around 5m to 6m.

This confirms that the revised planting scheme will provide adequate screening in due course, and that the existing hedgerows and isolated vegetation will provide more immediate enclosure.

Rev.	Date	Comments	Drn	Chk	App
A	05/05/2016	Issued for Approval	JMH	DS	RC

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Project: ABLE Logistics Park

Client: ABLE Humber Ports Ltd

Drawing Title: Halton Marshes Wet Grassland Sight Line Sections

FOR APPROVAL

Scale:	Drawn By	Checked By	Approved By
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Date:	05/05/2016	05/05/2016	05/05/2016

Drawing No: ALP-002-00017 Revision: A

06/05/2016 09:39:08

APPENDIX C

Appropriate Assessment for HMWG

Land to the East of Skitter Road, Halton Marshes, East Halton

Planning permission for creation of habitat, primarily wet grassland

Appropriate Assessment under the under The Conservation of Habitats and Species Regulations 2010

Contents

Appendices

1 Summary- Record of Appropriate Assessment in accordance with Habitats Regulations Guidance Note 1.

1.1 Title of Plan or Project/Application: PA/2016/649

Planning permission for creation of habitat, primarily wet grassland.

1.2 Location of Plan or Project /Application

Land to the East of Skitter Road, Halton Marshes, East Halton

Grid Ref: E: 514494 N: 421301

See Location Plan- Appendix 1.

1.3 International Nature Conservation Site

Humber Estuary Special Protection Area (SPA) and Ramsar site

1.4 Nature/Description of Plan or Project/Application

1.4.1 The HMWGS provides 90.2ha of mitigation. This total area comprises:

- 52ha of core area; and
- 38.2ha of buffer, distributed as appropriate around the core area.

1.4.2 The HMWGS comprises a series of tiered scrapes with a back-up facility to draw water from Halton Drain as required. The main engineering works will be focussed on the southerly fields and will largely entail the creation of scrapes separated by raised saddles. Water control structures shall be installed to achieve the target

1.4.3 The buffer around the northern perimeter of the site will be augmented by the creation of 3.06 ha of neutral grassland, part of the habitat relocated from AMEP Mitigation Area A[1]. In places, hedges shall be removed, to provide the openness required by wintering waders. Ditches and hedgerows will be created on certain boundaries, to provide screening and the control of dogs.

1.4.4 The development programme initially aimed for construction through September and October 2016, such that the site would be ready for use through Winter 2016/17. However, in reality, construction will be delayed at least until consultees' concerns are overcome so that the planning application can be determined.

1.4.5 Grazing is proposed throughout the year, and across the site, using different animals to provide the correct sward conditions and to protect the ground and any nesting birds. The area of neutral grassland will be mowed once a year.

1.4.6 Relationship with approved mitigation

1.4.6.1 As proposed by Able UK, the HMWGS provides 52ha of core area, amalgamating the objectives of the three approved schemes. One the functions of the Habitats Regulations Assessment is to determine whether the proposal will meet the following objectives:

[1] Note that planning permission PA/2016/649, if granted, will not confer the right to relocate mitigation Area A from Killingholme Marsh. This will require other consenting processes.

- Able Logistics Park (ALP) Option 2

  12 of the 32 hectares of core area required under ALP Option 2 will be provided in the HMWGS. As part of a much larger core area (52ha in total) this will facilitate implementation of Phase 1 of the ALP;

- AMEP Mitigation Area A

  The 16.7ha core area of AMEP Mitigation Area A will be relocated to the HMWGS, and increased (by 3.3ha) to 20ha of core area, so providing mitigation for the development of the current site of Mitigation Area A and any further development on Killingholme Marshes; [2]

- AMEP Further Overcompensation

  As described by the applicant, a further 20ha of core area will be provided for the future delivery of the AMEP Further Overcompensation scheme for the Black-tailed godwit. The core area is surrounded by appropriately sized buffer. Note that Natural England does not describe this provision in terms of a core plus buffer. Instead, they view the provision as a response to the Secretary of State's requirement for 38.5 hectares of wetland habitat.

  In time, an additional 20ha of core area will be provided so as to facilitate implementation of the rest of the ALP. This can be provided:

  - at an agreed location off-site; or
  - once it is demonstrated that the compensatory habitat at Cherry Cobb Sands has achieved functionality such that the Further Overcompensation is not required, it can instead be banked, potentially being used for the remaining 20ha of ALP mitigation.

  The appropriate details would need to be agreed prior to any development of the ALP north of the railway line.

1.5 Date Appropriate Assessment Recorded

03 April 2017

1.6 This is a record of the appropriate assessment, required by Regulation 61 of the Habitats Regulations 2010, undertaken by North Lincolnshire Council in respect of the above plan/project, in accordance with the Habitats Directive (Council Directive 92/43/EEC). Having considered that the plan or project would be likely to have a significant effect on the Humber Estuary SPA and Ramsar Site and that the plan or project was not directly connected with or necessary to the management of the site, an appropriate assessment has been undertaken of the implications of the proposal in view of the sites conservation objectives.

1.7 Natural England was consulted under Regulation 61(3) on 26 May 2016 and the representations, to which this authority has had regard, are attached at Appendix 4. The conclusions of this appropriate assessment are in accordance with the advice and recommendations of Natural England.

1.8 The applicant was required to submit further information reasonably necessary for

[2] Note that planning permission PA/2016/649, if granted, will not confer the right to relocate mitigation Area A from Killingholme Marsh. This will require other consenting processes.

this assessment on 07 June 2016 and subsequent dates under Reg. 61(2) and replied with information between June 2016 and October 2016.

1.9 The opinion of the general public was taken under Reg.61(4) by way of further consultation etc and the views expressed (attached at Appendix 6) have been taken into account.

1.10 The site's conservation objectives have been taken into account, including consideration of the situation for the site and information supplied by Natural England (See Appendix 4). The likely effects of the proposal on the international nature conservation interests for which the site was designated may be summarised as:

1.10.1 Disturbance of wintering and passage waterbirds during the construction phase of the proposal.

1.10.2 Risk of inadequate delivery of waterbird mitigation and compensation requirements arising from the Able Logistics Park and Able Marine Energy Park.

1.11 The assessment has concluded that the plan or project as proposed would adversely affect the integrity of the site.

1.12 The imposition of conditions or restrictions on the way the proposal is to be carried out has been considered and it is ascertained that:

~~*a) conditions or restrictions cannot overcome the adverse effects on the integrity of the site.~~

~~Or~~

b) the conditions listed in section 8 of this document would avoid adverse effects on the integrity of the site.

Signed  Date 03 April 2017

Andrew Taylor

Designation: Project Officer (Ecologist)

2 Introduction

2.1 PA/2016/649 is a planning application to create habitat, primarily wet grassland, at Halton Marshes. The habitat is required primarily to provide for passage and wintering waterbirds displaced by the Able Logistics Park (ALP) and Able Marine Energy Park (AMEP) projects. Although the project is required as mitigation and compensation under the Habitats Regulations, the delivery of the project itself could cause noise and visual disturbance of waterbirds. It is also important to ensure that the project will fully deliver the mitigation and compensation requirements of the other projects. For these reasons, an appropriate assessment is required.

2.2 North Lincolnshire Council has determined that:

2.2.1 The plan or project is not directly connected with, or necessary to, the management of the Humber Estuary Special Protection Area (SPA) and Ramsar site or Humber Estuary Special Conservation Area (SAC) for nature conservation.

2.2.2 The plan or project is likely to have a significant effect alone or in combination with other plans and projects on the Humber Estuary Special Protection Area (SPA) and Ramsar site.

2.2.3 The plan or project is not likely to have a significant effect alone or in combination with other plans and projects on the Humber Estuary Special Conservation Area (SAC).

2.3 Therefore, as the Competent Authority for the plan or project, North Lincolnshire Council must carry out an appropriate assessment in accordance with Regulation 61 of The Conservation of Habitats and Species Regulations 2010

2.4 This document is the formal record of that process.

3 The Appropriate Assessment Process

3.1 The process is described in detail in Circular 06/2005. The Council has followed the Circular as closely as possible. The main stages in the process are as follows. Note that if there are no harmful effects on the features of the Humber Estuary, or if these effects can be prevented, not all of the stages will be required.

3.1.1 Determination of Likely Significant Effect

3.1.2 Appropriate Assessment with regard to site Conservation Objectives.

3.1.2.1 Determine whether there will be an Adverse Effect on the Integrity (AEOI) of the International Nature Conservation Sites with reference to all the relevant interest features.

3.1.2.2 Consider possible restrictions and conditions.

3.1.2.3 Consider alternative approaches.

3.1.2.4 Consider any Imperative Reasons of Over-riding Public Interest (IROPI).

3.2 Put simply, the Local Planning Authority can only grant planning permission if, at a given stage in 3.1 above, in can be ascertained that the proposal would not

adversely affect the integrity of the International Nature Conservation Sites. Even if, at a late stage in considerations, IROPI were found to apply, compensatory measures would need to be provided.

3.3 Circular 06/2005 describes the key decision to be made as follows:

3.3.1 "In the light of the conclusions of the assessment of the project's effects on the site's conservation objectives, the decision-taker must determine whether it can ascertain that the proposal will not adversely affect the integrity of the site(s). The integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified. It is not for the decision-taker to show that the proposal would harm the site, in order to refuse the application or appeal. It is for the decision-taker to consider the likely and reasonably foreseeable effects and to ascertain that the proposal will not have an adverse effect on the integrity of the site before it may grant permission. If the proposal would adversely affect integrity, or the effects on integrity are uncertain but could be significant, the decision-taker should not grant permission, subject to the provisions of regulations 49 and 53 as described below."

3.3.2 "..In the Waddenzee judgment, the European Court of Justice ruled that a plan or project may be authorised only if a competent authority has made **certain** that the plan or project will not adversely affect the integrity of the site. "*That is the case where no reasonable scientific doubt remains as to the absence of such effects*". Competent national authorities must be **"*convinced*"** that there will not be an adverse affect and where doubt remains as to the absence of adverse affects, the plan or project must not be authorised, subject to the procedure outlined in Article 6(4) of the EC Habitats Directive regarding imperative reasons of overriding public interest." – ODPM 2005.

3.4 On this "precautionary principle", English Nature's Interim Regulation 33 advice for the Humber gives the following guidance:

3.4.1 "All forms of environmental risk should be tested against the precautionary principle which means that where there are real risks to the site, lack of full scientific certainty should not be used as a reason for postponing measures that are likely to be cost effective in preventing such damage. It does not however imply that the suggested cause of such damage must be eradicated unless proved to be harmless and it cannot be used as a licence to invent hypothetical consequences. Moreover, it is important, when considering whether the information available is sufficient, to take account of the associated balance of likely costs, including environmental costs, and benefits (DETR & the Welsh Office, 1998)." – English Nature 2003.

4 Description of Development

4.1 The following description has been adapted from the submitted planning statement:

4.2 Halton Marshes Wet Grassland Scheme (HMWGS)

4.3 Overview

4.3.1 The HMWGS has been developed over several years and is now proposed as a scheme that incorporates advice received from key advisers: North Lincolnshire Council; Natural England; and the RSPB.

4.3.2 The Feasibility Study details the process of developing the HMWGS to fulfil the temporary and permanent spatial requirements of appropriate habitat for the target bird species. Different options have been considered to refine the submitted scheme such that it provides the optimum habitat sought for the target species and fully transposes objectives of the approved mitigation and compensation schemes.

4.3.3 The HMWGS provides 90.2ha of mitigation. This total area comprises:

- 52ha of core area; and
- 38.2ha of buffer, distributed as appropriate around the core area.

4.4 Design

4.4.1 In short, the HMWGS comprises a series of tiered scrapes with a back-up facility to draw water from Halton Drain as required (i.e. to ensure appropriate water levels in dry years). The main engineering works will be focussed on the southerly fields.

4.4.2 Works in the northern field will be limited to blocking the field drain system and including a small drain to allow drainage of a depression in the land over the winter months. This field typically holds good numbers of Golden Plovers during the winter months, which prefer drier ground; it is suitable in its current state and will be enhanced by removal of identified hedgerows and by blocking field drains.

4.4.3 The buffer around the northern perimeter of the site will be augmented by the creation of 3.06 ha of neutral grassland, part of the habitat relocated from AMEP Mitigation Area A. [3]

4.4.4 On the north-eastern boundary, a ditch will be created parallel to the sea wall; this is intended to discourage dogs from accessing the site. Along the seaward side of that ditch a new hedge will be planted, to provide screening for the new wetland area.

4.4.5 An operational buffer will be provided to the west of Halton Drain. It is proposed its use will be restricted, through an appropriate planning condition, to non-disturbing activity.

4.4.6 The scrapes will be separated with saddles to ensure that water is retained throughout the system and doesn't simply flow to the lowest point. The

[3] Note that planning permission PA/2016/649, if granted, will not confer the right to relocate mitigation Area A from Killingholme Marsh. This will require other consenting processes.

saddles will essentially comprise an earth core that is protected from erosion by a geogrid or concrete pavement.

4.4.7 To avoid excessive water standing on site, the scrape system incorporates a series of release bungs. These are simply pipes fitted with a bung that can be manually fitted or removed. The system of release bungs allows the connected scrapes to act as drains and discharge water to the retained field boundary drains when the bungs are removed. The scheme is designed for flexibility and an adaptive management approach.

4.4.8 Hedgerows on the northern and southern boundaries will be retained and planted up, to provide enhanced screening for the new wetland area. These will also continue to support the bat species that have been recorded foraging within the site. All other hedgerows within the site will be removed to improve visibility for the birds. Removal of these hedgerows will have minimal impact on the ecological value of the site and should be readily undertaken during construction.

4.4.9 The development programme initially aimed for construction through September and October 2016, such that the site would be ready for use through Winter 2016/17. However, in reality, construction will be delayed at least until consultees' concerns are overcome so that the planning application can be determined. Construction hours of operation are proposed to be those of condition 39 of consent reference PA/2015/1264:

- Where the work is within 200 metres of any residential property: 8am to 6pm Monday to Friday; 8am to 2pm on Saturday; and not at all on Sunday, Bank Holidays or national holidays;

- Where work is greater than 200 metres from any residential property: 7am to 9pm Monday to Saturday; and not at all on Sunday, Bank Holidays or national holidays.

4.5 Habitats Created and Future Maintenance

4.5.1 The core area covers 52ha, Surrounding the core area are the buffers, covering a total of 38.2ha comprising:

- 31.6ha of wet grassland buffer;
- 3.06ha of neutral grassland buffer; and
- 4.9ha of operational buffer (restricted to non-disturbing activity).

4.5.2 The focus for the HMWGS has been on the creation of wet grassland. However, the project includes the wider objectives of AMEP Mitigation Area A[4], also providing: foraging habitat for bats; neutral grassland; tussocky swards for nesting skylarks and meadow pipit; and clearance of vegetation where it results in overshadowing or cover for natural predators.

4.5.3 Details of management and maintenance of the HMWGS are set out at sections 6.2 and 6.4.6 of the JBA Report; in addition, the habitat would be subject to the objectives of the TEMMP, which would be revised to suit the relocated site and re-submitted for approval.

4.5.4 The site will have the appearance of open wet grassland and it is expected that the bird species will range across it, taking advantage of seasonal

[4] [4] Note that planning permission PA/2016/649, if granted, will not confer the right to relocate mitigation Area A from Killingholme Marsh. This will require other consenting processes.

changes in the water levels. There will be further habitats provided including: bats will benefit from ponds and scrapes as foraging habitats; passerines, such as Skylark and Meadow Pipit will benefit from the dry areas to breed and forage in.

4.5.5 Grazing is proposed throughout the year, and across the site, using different animals to provide the correct sward conditions and to protect the ground and any nesting birds. The area of neutral grassland will be mowed once a year.

4.6 Relationship with approved mitigation

4.6.1 As proposed by Able UK, the HMWGS provides 52ha of core area, amalgamating the objectives of the three approved schemes. One the functions of the Habitats Regulations Assessment is to determine whether the proposal will meet the following objectives:

- ALP Option 2

12 of the 32 hectares of core area required under ALP Option 2 will be provided in the HMWGS. As part of a much larger core area (52ha in total) this will facilitate implementation of Phase 1 of the ALP;

- AMEP Mitigation Area A

The 16.7ha core area of AMEP Mitigation Area A could be relocated to the HMWGS, and increased (by 3.3ha) to 20ha of core area, so providing mitigation for the development of the current site of Mitigation Area A and any further development on Killingholme Marshes; [5]

- AMEP Further Overcompensation

A further 20ha of core area could be provided for the future delivery of the AMEP Further Overcompensation scheme for the Black-tailed godwit. The core area is surrounded by appropriately sized buffer zones, as shown on Figure 2-3 of the JBA Report:

- 50m to the north, the adjacent land use (flood defence and the Humber Estuary) cannot change.
- 50m to the east, the adjacent land use (flood defence and the Humber Estuary) cannot change.
- 50m to the south, the adjacent land use (hedgerow and recreational fishery within the local site of interest for nature conservation) cannot reasonably be expected to change. ABLE now holds the shooting rights over Winter's Ponds/Clay Pits; consequently, the cessation of this activity is within the applicant's control.
- 150m to the west, the fullest extent of buffer is provided here as this boundary borders with the ALP.

4.6.2 Note that Natural England does not describe the overcompensation in terms of a core plus buffer. Instead, they view the provision as a response

[5] Note that planning permission PA/2016/649, if granted, will not confer the right to relocate mitigation Area A from Killingholme Marsh. This will require other consenting processes.

to the Secretary of State's requirement for 38.5 hectares of wetland habitat.

4.6.3 In practical terms, the mitigation areas are being provided in slightly different locations than as approved; the ALP mitigation is moving north, with the AMEP Further Overcompensation moving south.

4.6.4 In time, an additional 20ha of core area will be provided so as to facilitate implementation of the rest of the ALP. This can be provided:

- at an agreed location off-site; or
- once it is demonstrated that the compensatory habitat at Cherry Cobb Sands has achieved functionality such that the Further Overcompensation is not required, it can instead be banked, potentially being used for the remaining 20ha of ALP mitigation.

4.6.5 The appropriate details would need to be agreed prior to any development of the ALP north of the railway line.

4.7 Relationship with flood defence works

4.7.1 The ALP consents include a requirement to undertake works to the sea wall, thus ensuring flood protection to this area into the long term. The approved works have not commenced to date and consequently will be programmed after the construction works necessary to create the HMWGS. A buffer of 150m is desired between the flood defence works and the core area.

4.7.2 The approved phasing of the ALP means that development:

- located north of the railway line cannot commence until mitigation areas are agreed; and
- comprising the erection of a building located in flood zone 3 cannot commence until those flood defence improvements are completed.

4.7.3 Land to the west of the HMWGS will not be developed prior to completion of the flood defence works, which is entirely in the control of the applicant. Able UK proposes to temporarily move the core area of the HMWGS to the west whilst construction work on the sea wall is progressing, so providing a 150m buffer to those works. The core area would return to its original position on completion of the sea wall. Another of the functions of the Habitats Regulations Assessment is to determine whether this temporary westward movement of the mitigation area is viable in the context of ongoing agricultural operations.

5 Summary of Likely Significant Effects on the International Nature Conservation Sites.

5.1 Disturbance of wintering and passage waterbirds during the construction phase of the proposal.

5.2 Risk of inadequate delivery of waterbird mitigation and compensation requirements arising from the Able Logistics Park and Able Marine Energy Park.

6 Disturbance of wintering and passage waterbirds during the construction phase of the proposal.

6.1 Background

6.1.1 Construction works can clearly cause temporary disturbance and displacement of SPA birds. Various factors need to be considered to give greater clarity as to whether a given source or combination of sources of construction-related disturbance could have an adverse effect on the SPA. For example, Habitats Regulations Guidance Note 3 (HRGN3) requires a competent authority to consider the "magnitude, likely duration and reversibility or irreversibility" of each potential effect on a Conservation Objective before determining whether each effect is a LSE. HRGN1 requires us to consider the "nature, scale, geographic extent, timing, duration and magnitude of direct and indirect effects" as well as considering mitigation measures. Disturbance and displacement due to construction works are clearly reversible. The other factors require more detailed consideration on a case-by-case basis. Any determination of AEOI here must relate to evidence that disturbance and displacement can have an effect on the estuary-wide distribution of birds, an impact at the population level or at least scientific doubt that a population level effect can be ruled out.

6.2 Likely Significant Effects

6.2.1 Construction disturbance of birds using the intertidal area.

6.2.1.1 Large numbers of birds, particularly Lapwing, have been recorded using the intertidal WeBS sector ISI that is adjacent to the application site. However, the majority of these birds use the southern half of the sector, away from the application site, where there is a wider expanse of mudflat (Catley 2007, 2008). Waterbirds using the northern section of ISI, along the Able UK frontage tend to be concentrated largely within and up to 500 metres south of East Halton Skitter (ibid, pers obs.). Species recorded here include teal, black-tailed godwit (in small numbers), redshank and shelduck- largely between October and February. The harsh weather events recorded in surveys were in the coldest months of December and January. Recorded numbers of birds using intertidal area ISI are given in Taylor (2010b)

6.2.1.2 Those birds that do use the intertidal area next to the application site could be disturbed or displaced by any noisy earth movements that take place in the passage and wintering periods. Monitoring works carried out by the Environment Agency, however, have shown that redshank flocks will feed and roost normally within 100-125 metres of vibration piling works (Cutts, N 2009). Any effects of such displacement will generally be very local (within a few hundred metres) and temporary and would not lead to any effects at the population level. However, there remains a chance that disturbance around the more confined area of East Halton Skitter during periods of hard frost could restrict birds' ability to feed and lead to greater energy loss through flight movements.

6.2.2 Construction disturbance of birds using existing farmland and wetlands for feeding, roosting and loafing.

6.2.2.1 Construction works have the potential to disturb and/or displace

waterbirds using East Halton Pits and the existing farmland in significant numbers.

6.2.3 Construction disturbance of birds using created wetland habitats.

6.2.3.1 Depending on the length of time taken to complete works, wetlands for SPA birds, to be created in the early stages of the proposed development could be subjected to construction disturbance during subsequent works. The intention is that the wetland areas should provide for waterbirds displaced from other parts of the site. Therefore, if these areas are themselves subject to disturbance, this could be a LSE.

6.3 In-combination effects.

6.3.1 Birds disturbed and displaced from feeding, roosting and loafing areas on or around one part of the application site may normally move to other parts of the application site; other agricultural fields or areas of intertidal habitat; existing wetlands; mitigation wetlands (once created) or other parts of the South Humber Gateway. Other construction projects proposed in the south Humber Gateway at the same time could in theory reduce the area of habitat available that is free of disturbance, thus reducing one of these options. However, movements to the other areas described above will generally remain possible.

6.3.2 Projects likely to take place in the South Humber Bank Area over the next few years are described below:

6.3.3 Able Logistics Park (ALP)- PA/2009/0600 & PA/2015/1264

6.3.3.1 This project has full planning permission. If implemented, it will result in the development of much of Halton Marsh. Mitigation for loss of waterbird feeding and roosting habitat for this project forms the basis of much of the strategic mitigation for North Lincolnshire and is the subject of the current proposal (PA/2016/649). Planning conditions have been used to address other likely significant effects, including direct loss of mudflat, water pollution and construction and ongoing disturbance of birds. In terms of noise and visual disturbance of birds, this project could act in combination with PA/2016/649. If both projects comply with previously agreed phasing and similar planning conditions, it should be possible to avoid adverse effects on the integrity of the international nature conservation sites.

6.3.4 Able Marine Energy Park (AMEP)

6.3.4.1 This project, to create a large new quay over a large area of intertidal and subtidal habitat, would have an Adverse Effect on the Integrity (AEOI) of the Humber Estuary SAC, SPA and Ramsar site alone with regard to impacts on these habitats and the species supported by the habitats. It is not appropriate to consider this project in combination with other plans or projects, in terms of these impacts.

6.3.4.2 AMEP may have other effects, such as noise, light and visual disturbance and the potential for pollution of estuarine waters. The appropriate assessment of AMEP found that these impacts would have no AEOI alone on the International Natures Conservation Sites. Therefore these impacts may need to be considered in combination

with the current project. With the AMEP wet grassland mitigation moving to Halton Marsh, this in-combination assessment is particularly pertinent.

6.3.5 Able Marine Energy Park Enabling Works PA/2013/0519 & PA/2014/0512

6.3.5.1 These proposals mainly entail land-raising and compaction of stone fill material within the AMEP site. Either or both projects could lead to noise and visual disturbance of curlew in the construction phase. Through the use of soil bunds and the provision of alternative feeding areas for the duration of construction, it has been possible to record that these projects would have no adverse effect on the integrity of the Humber Estuary SPA and Ramsar site. These projects will not act in combination with PA/2016/649

6.3.6 North Killingholme Power Project- CGen Killingholme Ltd.

6.3.6.1 This project to build a new power station at North Killingholme could have impacts on Humber Estuary SAC, SPA and/or Ramsar features through fish impingement, discharge of cooling water into the estuary, air pollution and construction and operational disturbance effects. The requirements and conditions in the development consent order should ensure that the project will have no adverse effect on the integrity of the Humber Estuary SAC, SPA and Ramsar site. The situation relating to residual effects is not clear.

6.3.7 SMART wind Projects 1 & 2

6.3.7.1 These offshore windfarm projects will have a number of offshore effects unrelated to the designated features of the Humber Estuary. Where the cable connection makes its landfall at horseshoe point, there will be a number of likely significant effects on the designated features of the Humber Estuary, including temporary loss of subtidal and intertidal habitat, temporary loss of prey for waterbirds from intertidal and subtidal habitat and construction disturbance to SPA./Ramsar waterbirds. The submitted information concludes that there will be no Adverse Effect on the Integrity of the Humber Estuary SAC/SPA/Ramsar site overall (SMARTwind 2015 & Infrastructure Planning). These projects are not likely to act in combination with the proposal being assessed here.

6.3.8 River Humber Gas Pipeline Replacement Project and Associated Enabling Works

6.3.8.1 This project will entail land-based drilling works at Paull, on the north bank of the Humber, and at Goxhill. At Goxhill, up to 1000 golden plover and significant numbers of lapwing and curlew are occasionally recorded in the zone that could be affected by direct displacement, noise or visual disturbance (Hyder 2015) Applying the precautionary principle, this could be a likely significant effect on the Humber Estuary SPA and Ramsar site.

6.3.8.2 For the enabling works, a waterbird and construction method statement has been agreed in writing with the local planning authority to minimise the risks. For the main project, works will be carried out strictly in accordance with a construction and environmental management plan. With these measures in place, these projects are

not likely to act in combination with the proposal being assessed here.

6.3.9 Killingholme Marsh Drainage Scheme

6.3.9.1 Works are proposed on Killingholme Marshes, south of North Killingholme Haven Pits and north of Killingholme Lighthouse. The works will entail drainage channel construction, construction of access roads and the construction of a pumping station with an outfall in the intertidal area. The creation of access routes near fields known to be used by feeding and roosting curlew and works to the pumping station outfall are proposed for the summer months, outside the period when passage and wintering waterbirds are present.

6.3.9.2 Given the mitigation and avoidance measures proposed, the residual effect will be of negligible disturbance and displacement of passage and wintering waterbirds. Therefore, the drainage scheme will not act in combination with the Able UK application in terms of construction disturbance to waterbirds.

6.4 Measures taken to minimise disturbance.

6.4.1 Construction disturbance of birds using the intertidal area.

6.4.1.1 Assessment of the ALP project revealed that construction works could take place near the floodbank, occasionally exceeding 55dB within the SPA in terms of noise. Significant numbers of birds are concentrated within and up to 500 metres to the south of East Halton Skitter, between the months of October and February (Catley 2007a, 2008a). It is anticipated that works for PA/2016/649 would employ similar machinery with similar noise ratings to the ALP proposals. However works to the northernmost field will be limited to blocking drains and digging a small new drain. It is unlikely that the birds on the intertidal habitat near East Halton Skitter will be affected by such works.

6.4.1.2 Furthermore, it is worth noting that the 55dB noise threshold is used as a precautionary restriction to avoid harm to birds in harsh winter weather. Able UK has submitted supporting information indicating that the existing noise climate around East Halton Marsh is frequently around 65dB LAmax (Able UK letter 30 September 2016). Birds are less likely to respond to such noise than to human presence. Any periods of severe and prolonged frost are only likely to occur between October and February.

6.4.2 Construction disturbance of birds using existing farmland and wetlands for feeding, roosting and loafing.

6.4.2.1 Phasing of works alongside ALP will ensure that different areas of the site are available for feeding, roosting and loafing at different stages of the developments.

6.4.2.2 Some temporary disturbance and displacement of waterbirds on or near the wet grassland creation area is inevitable with a construction project of the type proposed. Habitat Regulations Guidance Notes 1 and 3 guide competent authorities to consider the magnitude, duration and reversibility of such effects.

6.4.2.3 Clearly the construction disturbance is temporary (proposed over a few months) and reversible to the extent that, after the construction

period, waterbirds will no longer be subjected to construction activities. At Far Ings and Waters' Edge, Barton upon Humber, waders including curlew, lapwing and redshank were found to continue using the construction sites while earth-moving and localised construction works were taking place (Catley 2000-2003). Waterfowl using nearby waterbodies were not significantly affected (ibid).

6.4.2.4 Nevertheless, there is a likelihood that waterbirds currently using farmland and wetland will be disturbed and displaced. In the case of ruff and curlew, analysis of the Humber INCA bird reports suggests that these birds are strongly linked to the application site, whereas golden plover, lapwing and the less numerous species appear to be more wide ranging and less dependent on the application site.

6.4.2.5 Conditions will be required to ensure that habitat continues to be available for ruff and curlew in particular during site works. This requirement will be most acute when works are taking place around East Halton Pits. These conditions need to ensure that land in phases 3, 4, 5 and 6 of ALP is available for waterbirds while the mitigation wetlands are being developed. As well as ensuring continued provision for ruff and curlew, this approach is expected to benefit lapwing, golden plover and smaller numbers of other waders and wildfowl.

6.5 Conditions or restrictions required.

6.5.1 Conditions are required to secure the sensitive construction methods and timings described in section 6.4.2.5 above- see section 8 of this document.

6.6 Determination of AEOI.

6.6.1 In relation to disturbance and displacement, The Humber Estuary Final Draft Conservation Objectives for the SPA and Ramsar Site require, "No significant reduction in bird numbers either on the site, or from one part of the site to another attributable to anthropogenic factors… A 'significant' reduction will be determined on a case by case basis, however a decline of 1% or greater should be taken as a guide."

6.6.2 Construction works may lead to noise and visual displacement of birds using existing fields, wetland habitat or intertidal habitat. This was considered to be a likely significant effect for this project.

6.6.3 Provided that sensitive construction methods are followed, this residual disturbance effect will be negligible and will be extremely unlikely to lead to lasting effects on waterbird populations.

6.6.4 Provided that mitigation measures are secured by planning conditions and implemented in full, there will be **no Adverse Effect on the Integrity of the Humber Estuary SPA and Ramsar site due to noise and visual disturbance in the construction phase of development.**

7 Risk of inadequate delivery of waterbird mitigation and compensation requirements arising from the Able Logistics Park and Able Marine Energy Park.

7.1 Background

7.1.1 The Able Logistics Park and Able Marine Energy Park proposals have given rise to a number of likely significant effects relating to the disturbance and displacement of waterbirds from habitat within and supporting the Humber

Estuary SPA and Ramsar Site. Some of the effects with the greatest impact relate to the permanent loss of feeding, roosting and loafing habitat. These projects have requirements, restrictions and conditions securing mitigation and compensation measures to address these effects to the satisfaction of the competent authorities. Some of the most significant measures relate to the provision of replacement wet grassland habitat for waterbirds.

7.1.2 The Halton Marshes Wet Grassland Scheme needs to be assessed in combination with these projects to determine whether the overall provision of wet grassland mitigation and compensation is adequate to avoid an adverse effect on the integrity of the Humber Estuary SPA and Ramsar site.

7.1.3 The different disturbance, displacement and habitat loss effects are described in detail in the Habitats Regulations Assessment documents for each project. Whilst the projects need to be assessed in combination, it is not necessary or useful to revisit each significant effect in this document. As the effects have already been assessed, and the necessary mitigation and compensation measures described and quantified, all that is required is to assess whether the same scale and efficacy of mitigation and compensation can be delivered under the new proposals represented by the Halton Marshes Wet Grassland Scheme.

7.2 Able Logistics Park (ALP)

7.2.1 The background to the wet grassland proposal in relation to ALP is accurately summarised in the submitted Planning Statement:

7.2.1.1 "The ALP first gained planning consent on 10 July 2013 (reference PA/2009/0600). This permission was recently amended by planning consent granted on 1 February 2016 (PA/2015/1264). Within [the] planning statement, these are described as 'the ALP consents'.

7.2.1.2 The ALP comprises: extensive warehousing, external storage and transportation depots; café/restaurant and hotel premises; and associated service facilities, amenity landscaping and habitat creation.

7.2.1.3 Two habitat creation options are approved under the ALP consents, both using the southern half of the HMWGS application area now proposed (drawings referenced ALP-08024 Rev A (Option 1) and ALP-08025 Rev A (Option 2) both dated 15 February 2011).

7.2.1.4 Option 1 requires a core area of 20ha with a buffer. If this option were chosen an appropriate area of off-site mitigation (20ha) would also need to be provided. 20ha is considered by Natural England to be the minimum area that can fully function as a core area. Option 2 consists of a core area of 32ha surrounded by buffer, no additional off-site mitigation would be required. The mitigation is required to be provided as an element of phase 1 of the ALP; no part of the ALP is consented to commence north of the railway line until the SPA waterbird mitigation works have been satisfactorily completed."

7.2.2 Under PA/2016/649, the proposal is to provide 12 of the 32 hectares of core area required under ALP Option 2 in the HMWGS. This is intended to provide the mitigation required to allow the ALP area to be developed south of the East Halton railway line.

7.2.3 Before phases 3, 4, 5 and 6 of ALP are developed, a further 20 hectares of wet grassland habitat plus buffer will need to be provided, in accordance with

planning condition 49 of PA/2015/1264.

7.2.4 The HRA for ALP (Taylor 2011) states that:

9.4.2.3 "Field usage maps produced by Mott Macdonald (2009), suggest that for golden plover, lapwing and ruff, the most heavily used fields on the application site are north of the disused railway line. Curlew use fields north and south of the railway line, but the Catley reports 2007a, 2008a) reveal that, much of the time, fields south of the railway line are subject to disturbance and the northern curlew flocks use the fields north of the railway line roughly twice as much as those south of the railway line (2007/08 figures), or fourteen times as much if 2007 figures are applied."

7.2.5 32 ha of core habitat is required to mitigate for the loss of wader habitat in ALP as a whole. Taking a precautionary approach, using 2007/08 rather than 2007 figures for curlew, then usage of land south of the railway line may be assumed to account for about one third of this requirement i.e. around 10.67 hectares. Nearly all use of land by lapwing, golden plover, ruff and black-tailed godwit relates to land north of the railway line.

7.2.6 Therefore, applying readily available data, the assertion that a 12ha core area plus buffers is sufficient to mitigate for the impact of developing the Able Logistics Park (ALP) up to the railway line appears reasonable.

7.3 Able Marine Energy Park (AMEP) Area A

7.3.1 The background to the wet grassland proposal in relation to AMEP Area A is also accurately summarised in the submitted Planning Statement:

7.3.1.1 "The AMEP was granted permission as a development consent order on 29 October 2014 (reference SI 2014 No: 2935).

7.3.1.2 This extensive development would provide almost 1,300 metres of new deep water quays, designed specifically for the renewables sector and to provide a multi-user facility for the manufacture, storage, assembly and deployment of offshore wind turbines and their associated supply chains.

7.3.1.3 To address the recognised ecological impacts of AMEP, a package of mitigation and compensation measure have been approved, including five new habitats:

- Mitigation Area A;
- Mitigation Area B;
- Cherry Cobb Sands, compensation and over-compensation; and
- Further Overcompensation (sic) at Halton Marshes.

7.3.1.4 Mitigation Area A, adjacent to the southern edge of the AMEP site, was approved to provide wet grassland habitat for the use of feeding and roosting birds (primarily Curlew) and to replace the loss of Station Road Local Wildlife Site. The plot comprises a core area of 16.7ha, habitat buffers and a sown neutral grassland area."

7.3.2 PA/2016/649 has been designed with the intention that in the future, the 16.7ha core area of AMEP Mitigation Area A could be relocated to the HMWGS, and increased (by 3.3ha) to 20ha of core area, so providing mitigation for the development of the current site of Mitigation Area A and any

further development on Killingholme Marshes.[6]

7.3.3 In October 2011, Natural England wrote to the applicant, indicating that provision of mitigation habitat within the ALP area would enable the impact of the loss of feeding and roosting habitat from Killingholme Marshes to be mitigated (Letter dated 28 October, Appendix 4).

7.3.4 The South Humber Gateway Strategic Mitigation Strategy, referenced in the North Lincolnshire Core Strategy and Housing and Employment Allocations Development Plan Documents indicates that wet grassland mitigation habitat should be delivered both on Killingholme Marsh and Halton Marsh. However, it does also describe the potential for some of the mitigation requirement relating to Killingholme Marsh to be delivered at Halton Marsh.

7.3.5 The Housing and Employment Allocations Development Plan Document (adopted March 2016) includes the following supporting text for allocation SHBE-1 "South Humber Bank":

7.3.5.1 "The preferred alternative locations for waterbird mitigation at Halton Marsh and Killingholme Marsh have been indicated on Inset 57.The current locations for waterbird mitigation have been arrived at through the Mitigation Strategy Group assessing the best available evidence.

7.3.5.2 Developers could bring forward other alternative mitigation proposals, of at least equivalent area to that agreed under the ALP and AMEP projects, provided that they have an evidence base sufficient to demonstrate the ability of such waterbird mitigation to contribute to the overall mitigation strategy and avoid Adverse Effects on the integrity of the SPA/Ramsar site. This approach will enable to keep Policy SHBE-1 flexible and give the policy longevity, without future cause to involve formal amendments to the DPD or possible DPD departure procedures."

7.3.6 This gives policy support for the approach described in the 2011 Natural England letter. Within the Habitats Regulations Assessment of The Housing and Employment Allocations Development Plan Document, Policy SHBE-1. was assessed as follows:

7.3.6.1 "With these safeguards, Policy SHBE-1 will have no adverse effect on the integrity of the Humber SPA and Ramsar site in terms of disturbance to and permanent loss of terrestrial habitat supporting feeding, roosting and loafing SPA/Ramsar waterbirds."

7.3.7 The area proposed for HMWGS lies about 4km from AMEP Area A and a similar distance from the intertidal habitat at Killingholme frontage that will remain following the AMEP development. A search of the readily available literature suggests that wintering curlews will readily commute such a distance between estuaries and inland fields or between foraging sites (A.S. Holmes in Cramp (ed.) 1983, Wilson 1973, Bainbridge and Minton 1978 and Tasker & Milsom 1979 in Townshend 1981). Inter-refuge distances of around 3-6 km have been proposed for other wader species, such as grey plover and dunlin (Rehfisch et al. 1993).

7.3.8 Taking into account Natural England advice and the recorded commuting distances for curlew, it is reasonable to conclude that the mitigation for loss

[6] Note that planning permission PA/2016/649, if granted, will not confer the right to relocate mitigation Area A from Killingholme Marsh. This will require other consenting processes.

of feeding, roosting and loafing habitat for curlew from Killingholme Marsh, that would have been provided by Area A, can effectively be delivered by the provision of 20 hectares of core habitat, along with appropriate buffers at HMWGS.[7]

7.4 Compensation/Overcompensation for displacement of Black-tailed godwits by AMEP.

7.4.1 The principle of providing compensation for feeding black-tailed godwits on wet grassland at Halton Marsh was established by the Secretary of State in a letter of December 2013. The associated HRA notes the following at Section 25:

7.4.1.1 ANNEX 1- PLANNING ACT 2008: APPLICATION FOR THE PROPOSED ABLE MARINE ENERGY PARK DEVELOPMENT CONSENT ORDER

THE SECRETARY OF STATE'S ASSESSMENT IN ACCORDANCE WITH THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2010

7.4.1.2 25. The Panel recommended that the East Halton Marshes scheme should be included as a compensatory measure to provide as much available feeding ground as possible, given the disagreement between the applicant, Natural England and the RSPB during the examination about how much food-stock was required to replace the existing resource at North Killingholme Marshes (PR 10.158-164). Although the East Halton Marshes scheme was not included in the Compensation EMMP dated March 2013, the Secretary of State notes from the applicant's further information submitted on 15 October 2013 that it has now agreed to provide its land at East Halton Marshes for compensation. The applicant has also proposed improvements to its design proposals for the site to benefit BTG and other estuary birds such as surface water features and islands in scrapes to serve as secure roosts in winter. The applicant has agreed that delivery of these proposals could be secured by an amendment to the Compensation EMMP, which will have to be finally approved by Natural England under requirement 17(1) of Schedule 11 to the Order

7.4.2 No targets for numbers of black-tailed godwits on Halton Marsh have been set. However, paragraph 25 (7.4.2.1) above indicates that the area should "provide as much available feeding ground as possible" and that there should be "improvements to [Able UK's] design proposals for the site to benefit BTG and other estuary birds such as surface water features and islands in scrapes to serve as secure roosts in winter."

7.4.3 This document therefore needs to provide a qualitative assessment as to whether the submitted proposals meet these criteria.

7.4.4 Having considered Able UK's e-mail of 04 November (reproduced here in Appendix 4), Natural England advises that the overall area now proposed as compensation for black-tailed godwits is as sufficient as the original proposal.

7.4.5 Ability of wet grassland at HMWGS to provide as much feeding ground as possible for black-tailed godwits.

[7] Note that planning permission PA/2016/649, if granted, will not confer the right to relocate mitigation Area A from Killingholme Marsh. This will require other consenting processes.

7.4.5.1 Use of Wet Grassland by Black-tailed godwits

7.4.5.2 Wintering birds of the Icelandic race of black-tailed godwit *Limosa limosa islandica* are thought to feed preferentially on intertidal mud, with grasslands and other terrestrial habitats being less favoured (Alves et al. 2010). For this reason, the RSPB has questioned whether wet grassland can justifiably be used to contribute to compensation for the loss of intertidal mud. However, the principle of providing wet grassland has already been agreed (see above). Whilst this habitat is not a like-for-like replacement for intertidal mud, if a large enough area is provided to support significant numbers of feeding black-tailed godwit, then it can make a substantive contribution.

7.4.5.3 The South Humber Gateway 2010/11 surveys (Catley 2011) revealed significant use of fields by black-tailed godwits:

7.4.5.4 “In the early autumn during September significant numbers of Black-tailed Godwits were using some of the fields adjacent to the estuary for feeding. Most of the birds involved were juveniles that part of the population that is usually outcompeted by adults in use of prime feeding sites. Most of the fields used were dragged stubbles where the birds were presumably feeding on worms and invertebrates. The primary fields used were those from Goxhill Haven to East Halton Skitter and were immediately inland of the sea wall. Flocks of birds were observed moving between the roost at North Killingholme pits and the fields on a regular basis not just at high tide with some individuals possibly commuting on more than two occasions on a tidal cycle. Details of some of these observations are given below. Later in the winter period virtually all of the Black-tailed Godwits found on the fields were those that joined roosting Curlew on the old Huntsman site where they roosting at high water.

7.4.5.5 In week 2 during a very strong south-easterly wind a total of 392 birds was feeding in field 138 [within the proposed wet grassland area] in a narrow strip of dragged stubble sheltered from the wind at the southern side of the field. 85% of the birds were juveniles.

7.4.5.6 Subsequently in week 3 a flock of 360 birds was feeding on four fields in Goxhill Marsh, 116, 118, both mown hay fields, and 120 and 122 the latter being dragged, rape stubble, and 120 wheat stubble with a small strip dragged on the southern side. 90% of the birds were juveniles and they were actively feeding in all of the fields before at and after high tide. Some of the birds commuted to the adjacent inter-tidal when this was available but at high tide flocks moved to North Killingholme pits and back again so it was not possible to ascertain whether the same birds were involved and the total number of birds using the fields could have been higher than that recorded.

7.4.5.7 In week four the activity noted in week three was repeated with a minimum of 338 birds being seen at one time. Two colour ringed birds were seen; one Red Yellow Red Red flag was feeding in the same spot off Goxhill Skitter Ness where it spent most of the previous winter as a juvenile bird being last seen on February 16th 2010; the second bird Black Green Orange flag Black was a French ringed bird recorded in the autumn of 2010 at North Killingholme pits from August 2nd.”

7.4.5.8 This indicates that Black-tailed Godwits may be expected to use the HMWGS in significant numbers. Other examples of this species using wet grassland are provided by an IECS Report “Able Marine Energy Park Environmental Management and Monitoring Plan: 3. Compensation habitat – Cherry Cobb Sands RTE/managed realignment site and associated wet grassland area” (IECS 2012):

7.4.5.8.1 “Evidence of the value of grassland fields for foraging Black-tailed Godwits comes from a variety of sources including:

- at Clonakilty Bay in County Cork, where birds spend part of their time inland foraging on grassland fields from November onwards, supplementing the food obtained from the estuary mudflats (Hutchinson & O’Halloran, 1994); and
- at Poole harbour where terrestrial fields were considered of vital importance forshorebirds such as black-tailed godwit (Durell et al., 2006).”

7.4.5.9 The Birds of the Western Palearctic (Cramp (ed.) 1983) mainly describes the breeding habits and habitats of Black-tailed godwits. However, it does state that “ ..On land, probes soft soil, but also pecks food from surface and vegetation.”

7.4.5.10 The European Commission Management Plan For Black-Tailed Godwit (*Limosa limosa*) 2007–2009 recognises the importance of flooded grasslands for wintering black-tailed godwits in Portugal (European Communities, 2007).

7.4.5.11 Taken together, the above evidence indicates that wintering black-tailed godwits will use wet grassland for feeding.

7.4.6 Assessment of design features and proposed management for black-tailed godwit.

7.4.6.1 Brewis (2015) identified the primary objectives for management of wet grassland for black-tailed godwit as follows:

- Objective WG1: The site will contain wide, open expanses of wet grassland habitat with unobscured views of the surrounding area
- Objective WG2: The site should contain open water with at least one island suitable for roosting black-tailed godwits at high tide
- Objective WG3: The soil will be moist throughout the months of August to April to concentrate invertebrates at the surface and to ensure that the soil remains soft enough to be probed by waders
- Objective WG4: The site should be largely free of winter flooding to prevent floodwaters from killing soil invertebrates.
- Objective WG5: The site will have a high density of macro-invertebrate fauna to provide food for wading birds.
- Objective WG6: The wet grassland will be managed to give a suitable sward for wading birds throughout the months of August to March.

7.4.6.2 The target for black-tailed godwit within the Compensation Environmental Monitoring and Management Plan (CEMMP) for the wet grassland compensation at Cherry Cobb Sands is for a sward height of 10cm with livestock grazing proposed. A similar target would be appropriate for Halton Marsh.

7.4.6.3 To meet the requirements set by the Secretary of State's Habitats Regulations Assessment, the area of wet grassland provided should be of a comparable size to the area proposed in October 2013, should have design proposals "such as surface water features and islands in scrapes to serve as secure roosts in winter" and should "provide as much available feeding ground as possible".

7.4.6.4 The submitted Halton Marsh Wetland Feasibility Study (Jones & Sheehan 2016) sets out the key proposals for the design and management of wet grassland at Halton Marsh. The document is confusing in places, as it gives undue prominence to the breeding requirements of species that are not targets for the site and are not likely to breed in North Lincolnshire. However, the document does also set out targets and proposals for wintering waterbirds, including black-tailed godwit.

7.4.6.5 The proposals seem appropriate to provide the key requirements of appropriate grassland sward height, water at or near the soil surface, surface water features and islands. Furthermore, the proposals have been refined further in response to consultee's queries. Site monitoring, management plan updates and a proactive Steering Group are also proposed to encourage further refinement of site management to favour key targets. The consultees queries and the responses to them are set out in summary form in Appendix 6.

7.4.6.6 On that basis, it can be concluded that the proposals, with associated safeguards, will meet the requirements of the Secretary of State and will provide as much available feeding ground as possible.

8. Register of conditions or restrictions required.

8.1. Abstraction Licence (New condition)

Condition 1. No development shall take place until a long duration water abstraction licence to extract water from Halton Drain has been secured from the Environment Agency. The terms of the licence shall be adequate to meet the requirements of the water budget in at least 28 out of 30 reference years as set out in the Halton Marsh Wetland Feasibility Study.

8.2 Revised Management Plan (adapted from ALP PA/2009/0600 & PA/2016/1264)

Condition 2.[8] Within six months of the date of this decision, a conservation management plan for waterbird mitigation areas shall be submitted to and agreed in writing with the local planning authority. The plan shall include:

a) the aims and objectives of the plan, including proposed indicators of success;

b) details of the ecological requirements of target species and the ecological trends affecting them;

c) plans and details of habitats to be created and managed to support the target species, including details of earthworks, ground levels, islands, scrapes, soil properties, water control structures, ditches, waterbodies, target grassland sward types and any screening banks, hedgerows or reedbeds;

d) ongoing management measures to be implemented to maintain habitats in favourable condition;

e) detailed grazing prescriptions for wetland mitigation areas, including the means by which cattle shall have access to the proposed grassland areas;

f) details of measures required to ensure the welfare of grazing animals;

g) confirmation that areas of grass, rush and sedge shall be managed by cattle grazing, rather than mowing, unless agreed in writing by the local planning authority;

h) detailed prescriptions for control of water levels, inputs and output, including water budgets for average, dry and wet years;

i) timing of proposed works;

j) details of remedial measures to be carried out in the event of water levels or other target measures rising or falling beyond agreed limits;

k) persons responsible for:

- compliance with legal consents relating to nature conservation;
- compliance with planning conditions relating to nature conservation;
- installation of physical protection measures during construction;
- implementation of sensitive working practices during construction;
- regular inspection and maintenance of physical protection measures and

[8] North Lincolnshire Council, as Local Planning Authority, would expect the management plan to be prepared incorporating the relevant requirements of the Able Marine Energy Park (AMEP) Terrestrial Environmental Management and Monitoring Plan (TEMMP), particularly if the site is ultimately to be used for the delivery of AMEP overcompensation and the relocation of AMEP Area A. Natural England will be consulted on the discharge of this planning condition.

monitoring of working practices during construction;

- implementation of the management plan.

The conservation management plan shall be reviewed by the applicant or their successor in title every five years in order to achieve the stated aims and objectives. Following such five yearly reviews, any changes agreed between the applicant or their successor in title and the local planning authority shall be incorporated into a revised conservation management plan which shall thereafter be the conservation management plan for the purposes of all associated planning conditions.

Condition 3. The agreed conservation management plan shall be implemented in its entirety, in accordance with agreed timings, unless otherwise agreed in writing by the local planning authority. The features provided through implementation of the plan shall be retained and managed as agreed thereafter.

8.3 Construction methods (adapted from National Grid Enabling Works, Goxhill)

Condition 4. Works hereby permitted shall only be carried out between the months of March and September inclusive within any calendar year, unless a waterbird and construction method statement has been agreed in writing with the local planning authority. The submitted waterbird and construction method statement must include the following:

(i) details of measures that shall be put in place to avoid impacts upon waterbirds from noise or visual disturbance;

(ii) a programme of construction noise and visual disturbance monitoring and bird disturbance studies to be carried out with results to be submitted to the local planning authority weekly for the duration of site works;

(iii) details of thresholds for disturbance and/or displacement of waterbirds that shall trigger amendment of working methods in response to monitoring results;

(iv) details of the means by which amended sensitive working methods shall be agreed with the local planning authority;

(v) details of measures to control construction-phase light pollution.

Condition 5. All works carried out between October and February inclusive shall be carried out strictly in accordance with the agreed waterbird and construction method statement unless otherwise agreed in writing by the local planning authority. Prior to the completion of the approved development, the applicant or their successor in title shall submit a report to the local planning authority, providing evidence of compliance with the waterbird and construction method statement.

8.4 Monitoring (adapted from ALP PA/2009/0600 & PA/2016/1264)[9]

Condition 6. Within six months of the date of this decision, a bird monitoring programme shall be submitted to and agreed in writing with the local planning authority. The plan shall include

(i) bird monitoring methods and prescriptions for created wetland mitigation and

[9] North Lincolnshire Council, as Local Planning Authority, would expect the monitoring programme to be prepared incorporating the relevant requirements of the Able Marine Energy Park (AMEP) Terrestrial Environmental Management and Monitoring Plan (TEMMP), particularly if the site is ultimately to be used for the delivery of AMEP overcompensation and the relocation of AMEP Area A. Natural England will be consulted on the discharge of this planning condition.

compensation areas and their functionally related areas of intertidal habitat;

(ii) timing of bird monitoring including seasonal timing, frequency of counts, tidal state during counts, starting points and end points;

(iii) reporting standards, including format of annual reports, interim reports and measures to be derived from the raw data;

(iv) measures of favourable condition with reference to bird populations and assemblages using the created wetland mitigation and compensation areas and their functionally related areas of intertidal habitat;

(v) bird population and assemblage thresholds that indicate the presence or absence of adverse effect on the integrity of the Humber Estuary SPA and Ramsar sites

(vi) mechanisms for implementing any necessary remedial measures;

Condition 7. The agreed bird monitoring programme shall be implemented in its entirety, in accordance with agreed timings and methods, unless otherwise agreed in writing by the local planning authority.

8.5 Steering Group (adapted from ALP PA/2009/0600 & PA/2016/1264)

Condition 8. Prior to the commencement of development, the applicant or its successors in title shall agree in writing with the Local Planning Authority the terms of reference for an Environmental Steering Group to oversee implementation of mitigation measures and sensitive working practices. The Steering Group shall comprise suitably experienced representatives of the applicant or its successor, the local planning authority and other appropriate organisations by agreement. The steering group shall meet at least annually from the commencement of development to at least five years after the completion of all wetland mitigation areas for an annual monitoring review, unless otherwise agreed in writing with the local planning authority. Prior to the meeting, an environmental report, completed to an agreed standard, shall be provided by the applicant or their successor in title to all steering group members. Environmental actions agreed by the Environmental Steering Group shall be implemented in full in accordance with agreed timescales.

[Note: Condition 8 does not necessarily require the formation of a new Steering Group. It shall be possible, though not essential, to discharge the requirements of condition 8 through the operation of the ALP and AMEP Steering Groups. The potential for a new Steering Group is retained to cover the unlikely event of the land transferring to a different landowner]

8.6 Shooting

Condition 9 No wildfowling or sporting/ game shooting activities are to occur within the area demarked by the black line on drawing ALP-002-00024.

[see Appendix 4 for a copy of the drawing]

8.7 Reason (in each case)

To protect features of the Humber Estuary SPA and Ramsar Site in accordance with policies LC1 and LC2 of the North Lincolnshire Local Plan, Policy CS17 of the North Lincolnshire Core Strategy and Policy SHBE-1 of The Housing and Employment Allocations Development Plan Document

9. Overall determination of AEOI.

9.1. Project without restrictions or conditions.

9.1.1. The proposed project is not necessary for the management of the Humber Estuary SAC, SPA or Ramsar site.

9.1.2. The proposed project would have a likely significant effect on the Humber Estuary SPA and Ramsar site.

9.1.3. **Without conditions or restrictions, North Lincolnshire Council cannot ascertain that the proposed project would not have an adverse effect on the integrity of the Humber Estuary SPA and Ramsar site.** The sources of the adverse effect on integrity are listed below, along with the International Nature Conservation Site interest features affected:

9.1.3.1. Disturbance of wintering and passage waterbirds during the construction phase of the proposal.

9.1.3.2. Risk of inadequate delivery of waterbird mitigation and compensation requirements arising from the Able Logistics Park and Able Marine Energy Park.

9.2. Project with conditions and other positive measures

9.2.1. The planning conditions required to remove or minimise adverse effects on International Nature Conservation Site interest features are set out in section 8 above.

9.2.2. Overall, it is possible to ascertain that the proposal will not have an adverse effect on the integrity of the Humber Estuary SPA and Ramsar Site alone or in combination with other plans or projects.

Appendices

Appendix 1.

Location of Proposals in relation to the International Nature Conservation Site.

Title: PA/2016/646 Able UK Wet Grassland Boundary		Drawing No:	Version: 1
Drawn by: Andrew Taylor	Date: 16/11/2016	Scale @A4 1:10000	

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NORTH LINCOLNSHIRE COUNCIL
www.northlincs.gov.uk

Director of Places
Peter Williams
BSc,DMS,CEng,MEI,MCMI,AMIMechE

Appendix 2. Citations and Conservation Objectives.

European Site Conservation Objectives for Humber Estuary Special Area of Conservation Site code: UK0030170

With regard to the natural habitats and/or species for which the site has been designated („the Qualifying Features" listed below);

Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species;
- The distribution of qualifying species within the site.

Qualifying Features:

H1110. Sandbanks which are slightly covered by sea water all the time; Subtidal sandbanks

H1130. Estuaries

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1150. Coastal lagoons*

H1310. *Salicornia* and other annuals colonising mud and sand; Glasswort and other annuals colonising mud and sand

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

H2110. Embryonic shifting dunes

H2120. Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram

H2130. Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland*

H2160. Dunes with *Hippophae rhamnoides*; Dunes with sea-buckthorn

S1095. *Petromyzon marinus*; Sea lamprey

S1099. *Lampetra fluviatilis*; River lamprey

S1364. *Halichoerus grypus*; Grey seal

* denotes a priority natural habitat or species (supporting explanatory text on following page)

This is a European Marine Site

This site is a part of the Humber Estuary European Marine Site. These conservation objectives should be used in conjunction with the Regulation 35 Conservation Advice Package, for further details please contact Natural England‟s enquiry service at enquiries@naturalengland.org.uk, or by phone on 0845 600 3078, or visit the Natural England website at:

http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx

*** Priority natural habitats or species**
Some of the natural habitats and species listed in the Habitats Directive and for which SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Directive and the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Directive. The term „priority‟ is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Directive or the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

European Site Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) and Article 6(3) of the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or competent authority is required to make an Appropriate Assessment under the relevant parts of the respective legislation.
These conservation objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site can be said to demonstrate a high degree of integrity and the site itself makes a full contribution to achieving favourable conservation status for those features.

This document is also intended for those who are preparing information to be used for an appropriate assessment by either the appropriate nature conservation body or a competent authority. As such this document cannot be definitive in how the impacts of a project can be determined. Links to selected sources of information, data and guidance which may be helpful can be found on Natural England‟s website. This list is far from exhaustive.

European Site Conservation Objectives for Humber Estuary Special Protection Area

Site Code: UK9006111

With regard to the individual species and/or assemblage of species for which the site has been classified ("the Qualifying Features" listed below);

Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.

Subject to natural change, to maintain or restore:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features;
- The distribution of the qualifying features within the site.

Qualifying Features:

A021 *Botaurus stellaris*; Great bittern (Non-breeding)

A021 *Botaurus stellaris*; Great bittern (Breeding)

A048 *Tadorna tadorna*; Common shelduck (Non-breeding)

A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)

A082 *Circus cyaneus*; Hen harrier (Non-breeding)

A132 *Recurvirostra avosetta*; Pied avocet (Non-breeding)

A132 *Recurvirostra avosetta*; Pied avocet (Breeding)

A140 *Pluvialis apricaria*; European golden plover (Non-breeding)

A143 *Calidris canutus*; Red knot (Non-breeding)

A149 *Calidris alpina alpina*; Dunlin (Non-breeding)

A151 *Philomachus pugnax*; Ruff (Non-breeding)

A156 *Limosa limosa islandica*; Black-tailed godwit (Non-breeding)

A157 *Limosa lapponica*; Bar-tailed godwit (Non-breeding)

A162 *Tringa totanus*; Common redshank (Non-breeding)

A195 *Sterna albifrons*; Little tern (Breeding)

Waterbird assemblage

This is a European Marine Site

This site is a part of the Humber Estuary European Marine Site. These conservation objectives should be used in conjunction with the Regulation 35 Conservation Advice Package, for further details please contact Natural England‟s enquiry service at enquiries@naturalengland.org.uk, or by phone on 0845 600 3078, or visit the Natural England website at:

http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx

Explanatory Notes: European Site Conservation Objectives

European Site Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) and Article 6(3) of the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or competent authority is required to make an Appropriate Assessment under the relevant parts of the respective legislation.

These conservation objectives are set for each bird feature for a Special Protection Area (SPA). Where the objectives are met, the site can be said to demonstrate a high degree of integrity and the site itself makes a full contribution to achieving the aims of the Birds Directive for those features. On the first page of this document there may be a list of “Additional Qualifying Features identified by the 2001 UK SPA Review”. These are additional features identified by the UK SPA Review published in 2001 and, although not yet legally classified, are as a matter of Government policy treated in the same way as classified features.

This document is also intended for those who are preparing information to be used for an appropriate assessment by either the appropriate nature conservation body or a competent authority. As such this document cannot be definitive in how the impacts of a project can be determined. Links to selected sources of information, data and guidance which may be helpful can be found on Natural England‟s website. This list is far from exhaustive.

3. The Humber Estuary Ramsar site conservation objectives

3.1 Criterion 2: Conservation objective for the internationally important wetland, hosting an assemblage of threatened coastal and wetland invertebrates

Subject to natural change, maintain* the wetland hosting an assemblage of threatened coastal and wetland invertebrates in favourable condition, in particular:

10 Saltmarsh communities

11 Coastal lagoons

3.2 Criterion 3: Conservation objective for the internationally important wetland, supporting a breeding colony of grey seals *Halichoerus grypus*

Subject to natural change, maintain* the **wetland hosting a breeding colony of grey seals** in favourable condition, in particular:

12 Intertidal mudflats and sandflats

3.3 Criterion 5: Conservation objective for the internationally important wetland, regularly supporting 20,000 or more waterfowl

Subject to natural change, maintain* the **wetland regularly supporting 20,000 or more waterfowl** in favourable condition, in particular:

10 Intertidal mudflats and sandflats
11 Saltmarsh communities
12 Tidal reedbeds
13 Coastal lagoons

3.4 Criterion 6: Conservation objective for the internationally important wetland, regularly supporting 1% or more of the individuals in a population of one species or sub-species of waterfowl

Subject to natural change, maintain* the **wetland regularly supporting 1% or more of the individuals in a population of one species or sub-species of waterfowl** in favourable condition, in particular:

- Intertidal mudflats and sandflats
- Saltmarsh communities
- Tidal reedbeds
- Coastal lagoons

Note: The Ramsar site conservation objectives for **criterion 2 & 3** interest focus on the condition of the habitats that support or host species of international importance. Information on the status of the species in terms of national and international population and distribution trends will be used to inform judgements made with regards to the management and protection of the sites.

The Ramsar site conservation objectives for **criterion 5 & 6** interest focus on the condition of the habitats that support the bird populations. This is in recognition of changes in bird populations that may take place as a consequence of national or international trends or events. Annual counts for qualifying species will be used by Natural England in the context of five-year peak means together with other available information on the national and international population and distribution trends to inform judgements regarding the management and protection of the site.

* Maintain implies restoration if the feature is not currently in favourable condition.

Appendix 3 Natural England correspondence

Date: 28 October 2011

Peter Stephenson
Executive Chairman
Able UK Ltd
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Billingham Reach Industrial Estate
Billingham
Teesside
TS23 1PX

Email - pms@ableuk.com

Natural England
Touthill Close
City Road
Peterborough
PE1 1XN

Dear Peter

ABLE UK MARINE ENERGY PARK (AMEP)

Thank you for your email of 24 October and most recent letter, received on 26 October 2011 We welcome your proposal to "agree to disagree" on a number of matters and seek to agree a pragmatic way forward.

I committed to responding to you this week on two points; the footprint of the developmen site and the mitigation proposals. Our comments are therefore given below. We will provide a substantive response to the other key points raised in your correspondence next week.

Area of the proposed development site
We acknowledge that the statement under point 1 in our letter of 21 October could have beer clearer. We recognise that some of the area proposed for AMEP is currently consented and developed and therefore not all of the AMEP development site footprint is functioning habitat that will be permanently lost to SPA and Ramsar waterbirds. However, there will clearly be a significant change of use from the existing car storage to a new port facility and the impact of this must be adequately assessed under the EIA Regulations and the Habitats Regulations.

The documentation that we have recently received presents a number of differing figures for the land that is currently undeveloped; this figure varies from 102ha in your letter of 29 September to 154ha shown on the drawing attached to your email of 14 October. In your most recent letter it is stated that "planning consent already covers 122ha of that land", however the attachment to that letter lists planning permissions with a total area of 117ha. **We would be grateful if you could provide clarity on these figures.**

However, it is important to clarify that our advice on the amount of mitigation required for the loss of roosting and foraging habitat at Killingholme Marshes is based on the bird monitoring records of the area. This provides information on the actual fields utilised by waterbirds and so the areas already developed were not included in our calculations.

Mitigation principles

As you are aware, it is our advice that a core area of 16.7ha with a buffer of 150m where the adjacent land use is unsecured would be sufficient to mitigate for the loss of terrestrial feeding and roosting habitat within Killingholme Marshes. We welcome your acceptance of our advice and proposal "to include a 16.7ha core mitigation area within the red line boundary that we have used in our statutory consultations".

As discussed at our meeting in Peterborough it may be possible to reduce the 150m buffer along the sides adjacent to the fuel depot and the development site to 100m if further information is provided on the levels and types of activity that will be carried out on these sites. **We would be grateful if you could send this information through to us, as agreed in Peterborough, as soon as possible for our consideration.**

It is unclear what is meant by your statement that the core area will be buffered by "150m of farmland". All of the mitigation area, including the buffer must be optimally managed as wet grassland. This has been discussed previously and was one of the principles agreed in the MOU for ALP "Memorandum of Understanding For Able UK East Halton Application, 24th February 2011" signed by yourself, Peter Nottage Natural England and Peter Robertson RSPB. The reason that the entire area must be managed as wet grassland is to ensure that the core area is optimal at all times. If the surrounding buffer was an alternative habitat type then it would be almost impossible to ensure that the water levels and habitat quality within the entire core area was optimal wet grassland. As you are aware, the purpose of the buffer is to reduce disturbance to the core area so that the entire 16.7ha is able to function optimally at all times. It will not be possible therefore to farm the buffer as this will cause disturbance to the SPA/ Ramsar waterbirds. Subject to your confirmation on these points,

It is Natural England's opinion that this option of delivering sufficient mitigation within the footprint of AMEP would meet the requirements of the Habitats Regulations and mitigate the loss of feeding and roosting habitat from Killingholme Marshes.

Alternative mitigation options

Whilst the mitigation option described above would, in our view, meet the requirements of the Habitats Regulations, you have made it clear that you wish (and will plan) to mitigate for the loss of Killingholme Marshes at AMEP alongside the mitigation that you are providing for ALP. As discussed in Peterborough, we accept that there are alternative options where mitigation can be delivered in close proximity to AMEP but still within the South Humber Gateway and therefore these options would also meet the requirements of the Habitats Regulations and mitigate for the loss of feeding and roosting habitat at Killingholme Marshes.

Option 1

The option that was discussed in Peterborough was for the provision of a 20ha core area to partially mitigate for ALP and a 16.7ha core area to mitigate for AMEP – ie a 36.7ha core area. This would be surrounded by a 150m buffer, except adjacent to the seawall where a buffer of 50m was agreed if public access was screened. To complete the mitigation for ALP, this option also requires a 20ha core area surrounded by 150m buffers where the adjacent land is unsecured, outside of the South Humber Gateway. The location of this offsite

mitigation would be agreed with Natural England and would need to follow the principles of the South Humber Gateway and the Habitats Regulations in respect of delivering the conservation objectives for the site. All of the land should be optimally managed as wet grassland.

Option 2

Drawing No. ALP 08039 A attached to Neil Etherington's email of 14 October shows a core area of 48ha and as stated in our previous letter, if the core area is amended to 32ha + 16.7ha – ie a total core area of 48.7ha with a 150m buffer, except adjacent to the seawall where a buffer of 50m was agreed if public access was screened, then Natural England is of the opinion that this option would also meet the requirements of the Habitats Regulations.

Our advice is that option 2 represents the best option for the designated site, as it would create a large mitigation area in the closest proximity to the impacts of ALP and AMEP. However we advise that **there are three options – one on AMEP and two on ALP that we believe would all enable the impact of the loss of feeding and roosting habitat from Killingholme Marshes to be mitigated**.

Able UK has also put forward a number of other options that result in a reduction in the area of mitigation provided on the ALP site. As Natural England provided clear advice at our meeting in Peterborough that mitigation for AMEP could be moved to ALP, not to a location outside the South Humber Gateway, we assume that these options are proposals to amend the existing planning permission for ALP.

Your letter also states that "other alternatives may emerge and we would hope that you maintain an open mind in any future discussions". Obviously, Natural England is happy to keep an open mind and work with you on mitigation proposals, but we understood that there was a pressing timeframe to deliver AMEP and therefore submission to the IPC was imminent. We have provided advice on 3 options that, in our view, would meet the requirements of the Habitats Regulations; therefore we would welcome your decision over which one of these options to progress, rather than continued debate of alternative proposals.

In the interests of resolving our discussions on developments within the South Humber Gateway, we do not wish to reopen long and protracted discussions on previous cases. As you will be aware, resolution of ALP took considerable time and effort from a number of parties – Able UK, Natural England, RSPB, North Lincolnshire Council and Peter Barham Environment Ltd. If the mitigation for ALP was considerably revised then North Lincolnshire Council would need to undertake a new assessment under the Habitats Regulations and those parties that signed the MOU would need to be reconsulted and new agreements drawn up. It would seem that the public purse would be better served by advancing a positive outcome for the AMEP proposal that does not rely on significant amendments to the planning permission for ALP which threaten to undo much of the hard work put into that application.

Compensation

We will respond to the compensation proposals in our letter of detail next week.

Drax

As we stated in our previous letter, we are looking into the details of this case and will respond in detail in due course. However, we can assure you that it is unlikely that this will change the advice we have given for AMEP.

I would like to reassure you that we remain committed to regular open and transparent dialogue with Able UK to bring this proposal forward to the point of submission to the IPC as soon as possible. As you are aware, we have a teleconference set up on Wednesday with your team to discuss any outstanding matters.

Yours sincerely

[redacted]

Alan Law
Director, Land Use

Date: 21 June 2016
Our ref: 186827
Your ref: PA/2016/649

Andrew Law
North Lincolnshire Council
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T 0300 060 3900

BY EMAIL ONLY

Dear Andrew

Planning consultation: Planning permission for creation of habitat, primarily wet grassland
Location: Land to the East of Skitter Road, Halton Marshes, East Halton

Thank you for your consultation on the above dated 26 May 2016 which was received by Natural England on the same date.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

ARTICLE 16 OF THE TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) ORDER 2010
THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2010 (AS AMENDED)
SECTION 28I OF THE WILDLIFE AND COUNTRYSIDE ACT 1981 (AS AMENDED)

Internationally and nationally designated sites
The application site is within or in close proximity to a European designated site (also commonly referred to as Natura 2000 sites), and therefore has the potential to affect its interest features. European sites are afforded protection under the Conservation of Habitats and Species Regulations 2010, as amended (the 'Habitats Regulations'). The application site is in close proximity to the Humber Estuary Special Protection Area (SPA) and Special Area of Conservation (SAC) which is a European site. The site is also listed as Humber Estuary Ramsar site[1] and also notified at a national level as Humber Estuary Site of Special Scientific Interest (SSSI). Please see the subsequent sections of this letter for our advice relating to SSSI features.

In considering the European site interest, Natural England advises that you, as a competent authority under the provisions of the Habitats Regulations, should have regard for any potential impacts that a plan or project may have[2]. The Conservation objectives for each European site explain how the site should be restored and/or maintained and may be helpful in assessing what, if any, potential impacts a plan or project may have.

[1] Listed or proposed Wetlands of International Importance under the Ramsar Convention (Ramsar) sites are protected as a matter of Government policy. Paragraph 118 of the National Planning Policy Framework applies the same protection measures as those in place for European sites.
[2] Requirements are set out within Regulations 61 and 62 of the Habitats Regulations, where a series of steps and tests are followed for plans or projects that could potentially affect a European site. The steps and tests set out within Regulations 61 and 62 are commonly referred to as the 'Habitats Regulations Assessment' process.
The Government has produced core guidance for competent authorities and developers to assist with the Habitats Regulations Assessment process. This can be found on the Defra website. http://www.defra.gov.uk/habitats-review/implementation/process-guidance/guidance/sites/

Natura 2000 - Further information required
The consultation documents provided by your authority do not include information to demonstrate that the requirements of Regulations 61 and 62 of the Habitats Regulations have been considered by your authority, i.e. the consultation does not include a Habitats Regulations Assessment.

In advising your authority on the requirements relating to Habitats Regulations Assessment, it is Natural England's advice that the proposal is not necessary for the management of the European site. Your authority should therefore determine whether the proposal is likely to have a significant effect on any European site, proceeding to the Appropriate Assessment stage where significant effects cannot be ruled out. Natural England advises that there is currently not enough information to determine whether the likelihood of significant effects can be ruled out. We recommend you use the following information to help you undertake a Habitats Regulations Assessment:

General comments

- The Hendeca documents demonstrate a good understanding of what is a complex situation. These documents are comprehensive and easy to read.
- The HRA will need to determine whether a 12ha core area plus buffers is sufficient to mitigate for the impact of developing the Able Logistics Park (ALP) up to the railway line.
- There are various documents and permissions which overlap for this area in relation to habitat management. It would be useful to understand how Able plan to implement the various overlapping documents. At the Development Control Order (DCO) meeting on 14th June, it was suggested that the number of documents should be rationalised and Able would review the planning requirements for Able's Marine Energy Park (AMEP) and ALP to determine commonalities. Natural England suggested that each required document should then be completed to meet the most comprehensive requirement; the same document could then be used to discharge the conditions for ALP and the requirements for AMEP.
- Detailed thought appears to have been applied to the wet grassland design and management for the target species, this opinion is based on the provision that we are still awaiting comments from our hydrologist which will be provided at the earliest opportunity.
- A calendar across the year showing what the site management would be to meet the objectives for each month/each area/each species would be useful so that it is clear what the site management must achieve.
- It is unclear why there is still detailed discussion of breeding bird requirements as Natural England has flagged up many times that this is not the purpose of the wet grassland habitat. The introductory paragraphs of the Feasibility Study clearly state that the impacts are on wintering or passage birds, but the subsequent text focuses on habitat requirements for breeding birds. Clarification should be provided as to whether the management requirements stated are for breeding birds, or overwintering and passage birds (or a mixture). For example, table 2-2 states that black–tailed godwits require taller, ungrazed swards. It is assumed that this is a breeding bird requirement as the target for black-tailed godwit within the Compensation Environmental Monitoring and Management Plan (CEMMP) for the wet grassland compensation at Cherry Cobb Sands is for a sward height of 10cm with livestock grazing proposed. The objectives and targets in the CEMMP and Terrestrial Environmental Monitoring and Management Plan (TEMMP) should be referred where appropriate to improve clarity.
- In addition to Andrew Taylor's comments dated 7 June 2016 regarding additional requirements related to the discharge of PA/2009/0600; targets and objectives from the TEMMP also need to be factored into this application. For example objective BB1 of the TEMMP requires habitat provision at mitigation area A for farmland birds; this is not mentioned in the submitted documents. If mitigation area A is moved to Halton Marshes, Able need to ensure they can deliver all the required aspects at this new location. Natural England advises Able to review the TEMMP and provide further information regarding how all these requirements will be met in the new location.
- Winters Pond Local Wildlife Site (LWS) was previously an important site for ruff (an SPA/Ramsar site species). Natural England advises that the management for this site should be incorporated as part of the management for Halton Marshes.

- At the DCO meeting on 14th June, it was understood that a number of amendments would be made to the submitted documents; namely the addition of a wind pump, a reference to the retention of hedgerows from the planting plan would be corrected, and references to the area of neutral grassland habitat to be provided would be increased in line with Andrew Taylor's calculation.

Specific comments
Design and Access Statement

- As stated above, we found this document to be a clear, concise summary of a complex situation. The only comment we would make is the reference in several places in this document and the Planning Statement to "*greatly exceeding the 20ha minimum*" and "*extending the area covered by previous mitigation schemes.*" The proposed block of wet grassland habitat covered by this consultation is a large area for two reasons:
  1) the scale of the impacts from the two developments are significant, and
  2) it brings together the mitigation, compensation and overcompensation for the two developments

  i.e. there is no additional habitat provided by this proposal.

Planning Statement

- 2.2.8 – It is not understood what is meant by "*However, it is not intended that the HMWGS should supersede the ALP consents or prevent the potential for implementing the development, as approved within this area, at some point in the future*". This appears to be stating that the two planning permissions would still be active and both could be implemented for the same area of land. Natural England therefore seeks confirmation regarding the legal mechanism that will secure the wet grassland habitat as this is required to meet the requirements of the Habitats Regulations if ALP and AMEP are developed. Whilst it may be possible in theory to relocate the wet grassland in future, Natural England would strongly discourage this suggestion. Not only have these proposals been discussed in great detail for a considerable period of time; Able is aware that the wet grassland habitat will take time to become fully functional and for the site manager to get the water level management and grazing/sward height management correct. If Able propose to develop the land at Halton Marshes and move the wet grassland habitat; the new site would need to be fully functional before the existing site is developed. This would require Able to manage two wet grassland sites for a period of time; likely to be several years. It is also worth noting that the AMEP objectives for the wet grassland are contained within the TEMMP and this document is approved by Natural England and secured by legal agreement which includes the provision of a steering group. The legal agreement states "*Where Able proposes alterations to the Measures…… **and those proposals are accepted by the Steering Group**, Able shall implement those alterations*" (emphasis added). This also raises the question about how this change will be communicated to the steering group and how Able will obtain the acceptance of the Steering Group.
- 3.1.5 – This paragraph states that additional water may be required from Halton Drain. We note that the response from the Environment Agency dated 7 June 2016 advises that additional work is required regarding the need for a water abstraction licence. Natural England advises that this work is completed prior to determination of this application to demonstrate that sufficient water for the site can be provided.
- 3.1.9 – Further information is required on the proposed operational buffer which should include what activity/level of activity/noise levels are proposed to take place in this area.
- 3.1.10 – It is unclear if the area covered by the saddles would be unsuitable for use by birds. This should be assessed with the area deemed to be unsuitable provided and taken into account in the extent calculations.
- 3.2.2 – It is not clear from the wording of this paragraph whether shooting has actually stopped at Winters Pond; this should be confirmed.
- 3.2.8 – This refers to moving the core area to the west whilst the flood defence works are underway. Whilst Natural England agrees with this in principle, we note that the Environment Agency states in its letter of 7 June 2016 "*It cannot be emphasised strongly enough that the tidal flood defences along this reach are in need of urgent significant repair/upgrade.*

Regardless of the future alignment of flood defences in this area, the imminent need of large scale engineering works will be required. The presence of the habitat compensation site should both consider the impacts/disturbance from these necessary activities, and should not impact or hinder the delivery of flood risk management improvement works." Given that the core area of wet grassland habitat must be fully functional for the SPA/Ramsar site waterbirds when required, Natural England advises that the area to the west is included in the habitat creation and management now whilst machinery is on site. This will mean that there is no delay to the flood defence works.

Feasibility Study

- 2.1 – This states "*The Secretary of State's appropriate assessment for AMEP, took account of 38.5ha of land at Halton Marshes being provided as part of the compensation for the loss of inter-tidal foraging habitat on Black-tailed Godwits*". The wet grassland design now only refers to a 20ha core area as overcompensation and so confirmation is required that the total area provided as overcompensation is still ≥ 38.5ha.
- 6.2.1 – Natural England welcomes the proposal to graze the site with cattle and sheep; however we are not aware that livestock features have been incorporated into the design, such as fencing and a corral. These features are important to determine how the livestock will access the site and be managed within it. Natural England is also concerned by the statement "*Winter grazing needs to take account of the fact that much of the site, not included within the core area for Black-tailed Godwits, will be surface flooded.*" This is inconsistent with section 2.4 which states that one of the principle requirements is for "*Areas with no surface flooding in winter to promote foraging (all species)*" and the statement that golden plover "*prefer drier ground.*"
- 6.4 – This states that tiered scrapes are the preferred option; Natural England questions whether these can be delivered as the earlier information states that the site is relatively flat. Therefore details on whether earth moving is required during the design stage should be provided.
- 6.4.6.2 – This states "*From late summer into early autumn there is a requirement for open water for Blacktailed Godwits.*" Clarification should be provided to confirm if this is within specific areas opposed to across the whole site.
- 7 – The conclusion states that "An outline wet grassland scheme has been presented…" It is unclear if this means that there could still be significant changes to the scheme which would affect the conclusions of the HRA. Therefore confirmation is required as to when a finalised wet grassland scheme will be provided.

Site layout

- This states that fields will be sown with seed mix but the Feasibility Study states that this will not be done, therefore this inconsistency should be corrected.

SSSI - Further Information Required

Our concerns regarding the potential impacts upon the Humber Estuary SSSI coincides with our concerns regarding the potential impacts upon the Humber Estuary SAC, SPA and Ramsar site and are detailed above.

Should the application change, or if the applicant submits further information relating to the impact of this proposal on the SSSI aimed at reducing the damage likely to be caused, Natural England will be happy to consider it, and amend our position as appropriate.

If your Authority is minded to grant consent for this application contrary to the advice relating to Northumberland Shore contained in this letter, we refer you to Section 28I (6) of the *Wildlife and Countryside Act 1981* (as amended), specifically the duty placed upon your authority, requiring that your Authority;

- Provide notice to Natural England of the permission, and of its terms, the notice to include a statement of how (if at all) your authority has taken account of Natural England's advice, and

- Shall not grant a permission which would allow the operations to start before the end of a period of 21 days beginning with the date of that notice.

We would be happy to comment further should the need arise but if in the meantime you have any queries please do not hesitate to contact us.

For any queries relating to the specific advice in this letter only please contact Alastair Welch on 0208 0265530. For any new consultations, or to provide further information on this consultation please send your correspondences to consultations@naturalengland.org.uk.

We really value your feedback to help us improve the service we offer. We have attached a feedback form to this letter and welcome any comments you might have about our service.

We also welcome your feedback on Natural England's revised standing advice in terms of its usability (ease of access, presentation), quality of content and, its clarity and effectiveness as a tool in guiding decision-making. Please provide this, with any suggested improvements, by filling in the attached customer feedback form or by emailing your feedback direct to consultations@naturalengland.org.uk.

Yours sincerely

Alastair Welch
Yorkshire and northern Lincolnshire Area Team